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The OIL WEEKLY

OIL and GAS ENGINEERING

FOR OIL AND GAS PRODUCTION AND PIPE LINE DIVISIONS

THE WEEK'S NEWS INTERPRETED

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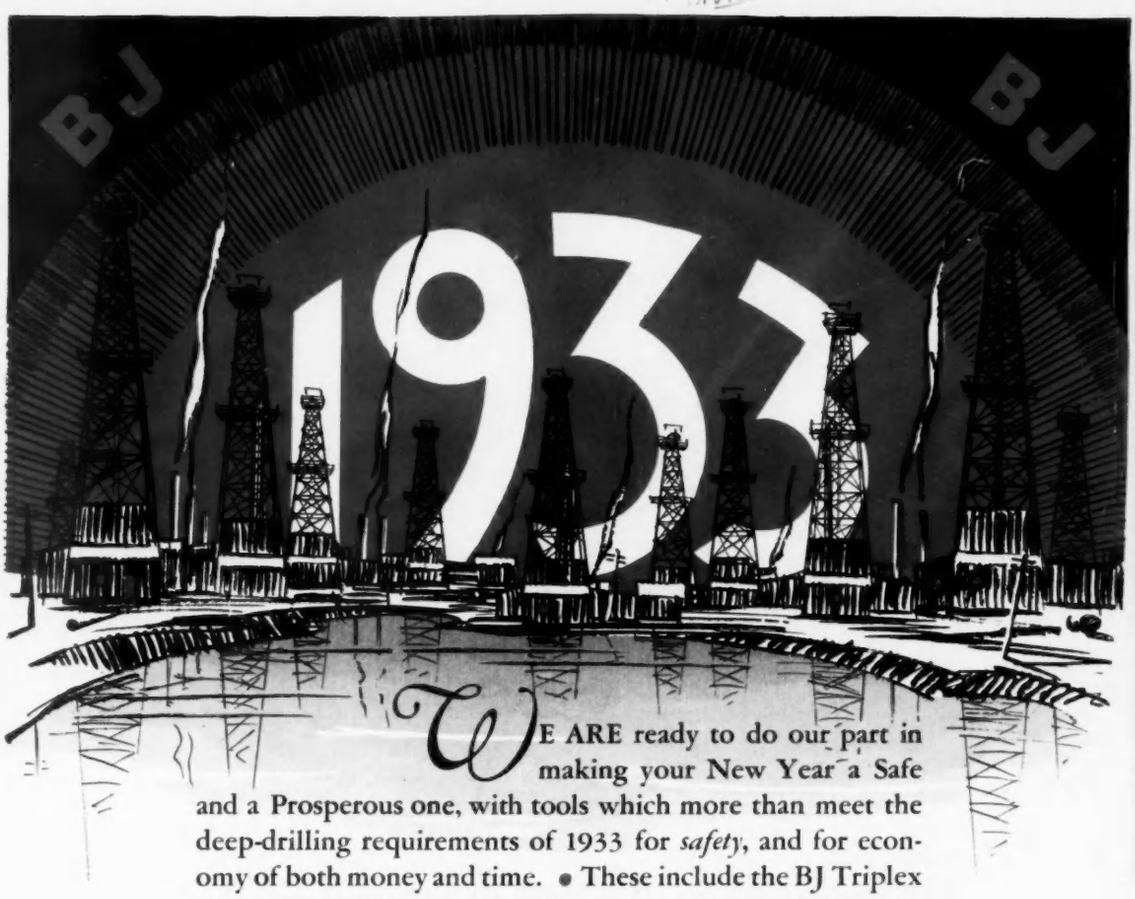

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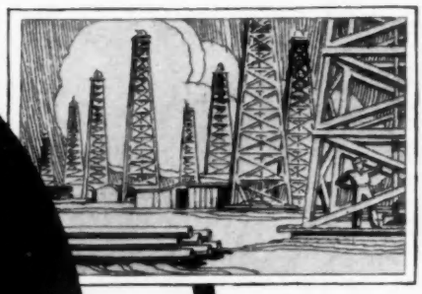

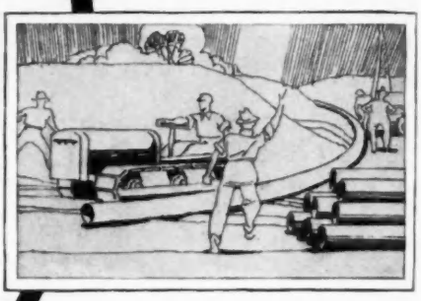

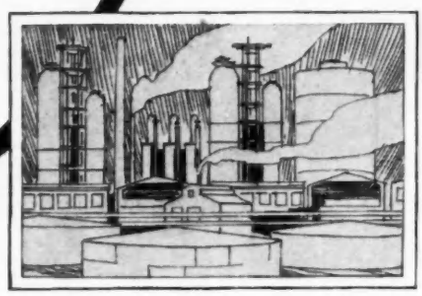

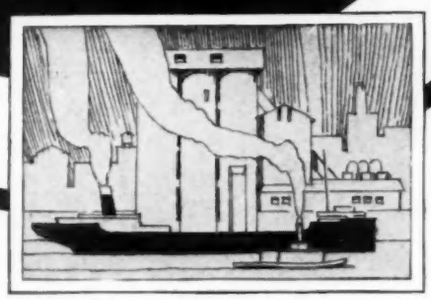

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Editor

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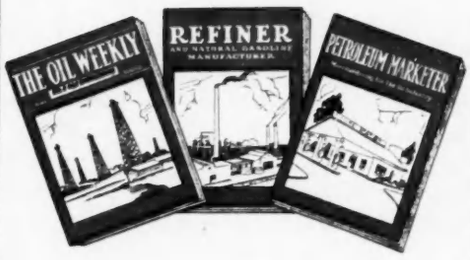

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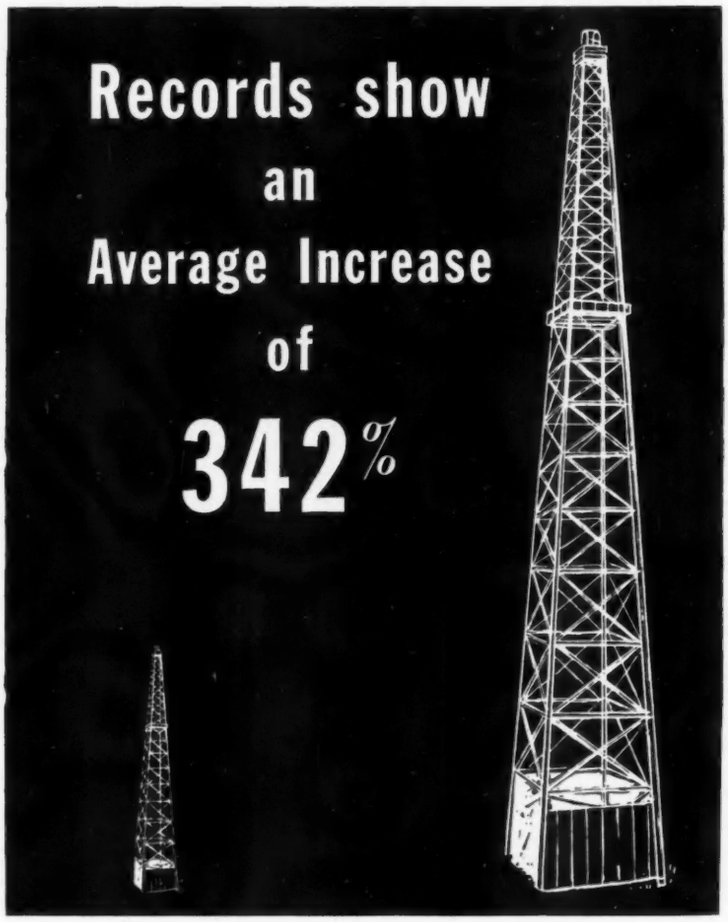

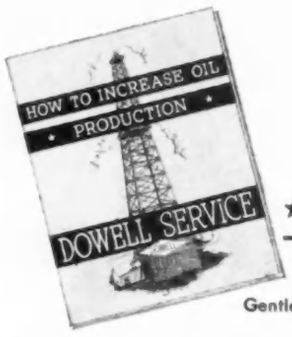

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VOLUME 68, No. 3 JANUARY 2, 1933

THE OIL WEEKLY

FOR OIL AND GAS PRODUCTION AND
PIPE LINE DIVISIONS

ENGINEERING • NEWS • STATISTICS

The Changing Panorama

At last a good word for third grade gasoline. From California comes the observation that ability of the substantial units to meet all low price competition with the third grade, and an implied determination to do such, has so stabilized the gasoline market on the West Coast that crude prices there are holding (precariously) there despite apparent inability of producers to get crude output within 30,000 barrels daily of the set quota. The situation in the Mid-Continent, however, is causing concern on the Coast and limited shipments of East Texas gasoline to the Northwest is a threat to retail market stability which may be eased by trading anti-knock material for the Atlantic seaboard for East Texas straight-run for third grade pumps on the Pacific Coast.

Page 29.

The sales department is falling down bad on selling fuel oil and it is checked back to the producer. Refiners have been cutting deeper into the crude oil to make more gasoline out of it and leave less fuel oil, but the demand for the latter product has been lowered—consumption has fallen further than the average of other commodities during the depression. A contributing

Scene on the Shatt-el-Arab River, above Anglo-Persian refinery and terminal at Abadan, Persian Gulf

cause, perhaps, is a return to coal by some plants that did burn oil, and extension of natural gas use in the Southwest and Far West where oil had its biggest entrenchment as boiler fuel. Cost is the factor in both cases. But whatever the cause, lower fuel oil consumption is being checked back to the producer by the refiner requiring less crude to produce gasoline by reason of cracking his surplus supply of fuel oil. Percentage of motor fuel recovery from crude has continued rising—now at 45 per cent, it will soon go to 50 per cent of the crude run. In simple terms that means that the modern refinery and pending improvements are requiring less crude to produce the required quantity of gasoline. Page 11.

Need Expert Advisers

The Texas Railroad Commission has made a plea for patriotic co-operation of producers in observing the rules promulgated by that body which should at least get the sympathy of those addressed. As a body, this is one of the few places where the word unique will apply. With specified powers of a broad nature, it is dependent upon other agencies to enforce its decrees, and being in an administrative position, each commissioner seems impressed with the fact that he is bound by judicial regulations which prevent them accumulating knowledge of the matters in hand and acting thereupon; they will accept nothing except sworn testimony given in their hearings which are organized much as are kangaroo courts. With minds trained principally for running for office, they are confronted with scientific and economic questions of a most complex nature. This would suggest that the body should be provided with a trained corps of experts in these matters, upon whose advice they could act, rather than upon the confusing ideas presented at the hearings and upon which experience has taught they are prone to issue orders which do not appear logical in court.

The Oil Man's Calendar

1933

JANUARY

7-14 *National Automobile Show, New York, Grand Central Palace.*

9-10 *Northwest Petroleum Association, North Dakota Division, Annual Convention, Fargo, North Dakota, Waldorf Hotel.*

12-13 *Northwest Petroleum Association, Minnesota Division, Annual Convention, St. Paul, Minnesota, Lowry Hotel.*

19 *Oklahoma Petroleum Marketers Association, Oklahoma City, Oklahoma.*

28-Feb. 4 *National Automobile Show, Chicago, Coliseum.*

FEBRUARY

7-8 *Iowa Petroleum Marketers Association, Des Moines, Iowa.*

15-17 *Ohio Petroleum Marketers Association, Columbus, Ohio, Deshler-Wallick Hotel.*

27-Mar. 14 *14th Exposition of Chemical Industries, New York, Grand Central Palace.*

MARCH

23-25 *American Association of Petroleum Geologists, Rice Hotel, Houston, Texas. Concurrent Meetings: Society of Petroleum Geophysicists and Society of Economic Paleontologists and Mineralogists, Houston, Texas, Rice Hotel.*

26 *American Chemical Society, Washington, D. C.*

APRIL

5-6 *Western Petroleum Refiners Association, Hot Springs, Arkansas.*

13-15 *Petroleum Industry Electrical Association, Tulsa, Oklahoma.*

17-23 *Oil Equipment and Engineering Exposition, Dallas, Texas.*

20-21 *National Petroleum Association, Cleveland, Ohio, Cleveland Hotel.*

JUNE

12-16 *American Oil Burner Association, Chicago, Stevens Hotel.*

OCTOBER

24-26 *Fourteenth Annual Meeting, American Petroleum Institute, Chicago.*

1932 Production Down

The year that has passed, let us hope, has been the most hectic in the history of the oil industry. During the period most concern of producers has been to hold production within reasonable distance of decreased demand. On that score preliminary estimates indicate there has been success—not too much success—but enough to still leave a gleam of optimism for the future. It is indicated that final tabulation will show output in the United States during 1932 was 7.2 per cent under the previous year, despite the fact that during the year just closed the industry was in position to produce an almost unbelievable quantity—certainly more than has ever been produced in any one year. Closing in of the big East Texas field during the last half of December kept output of crude just about in step with demand for the month. Page 9.

One of the permanent benefits of recent months of hard times in the oil business will be the progress made in economical recovery. One phase of this which will be of benefit when the surplus of oil inevitably diminishes, will be recovery of additional supplies from "depleted" sands by artificially propelling oil to the well. With this in mind, a laboratory experiment which, by the use of cores in the testing apparatus approximates the formation in place, shows possibilities of recovery by flooding, is interesting at this time.

That the lower section of the Texas Coast—below the Salt Dome region, is well worth the widespread interest it attracts as a future source of oil supply is shown from the number of producing sands which are uncovered there by continuous search over a territory of geological nature which has an element of uncertainty which intrigues. This is the reason this area will continue one of the busiest spots on the oil map for many months to come. Page 45.

Commission Continues Hearing *on East Texas* Proration to January 12

Austin, Texas.—Final phases of the East Texas part of the statewide proration hearing started by the Texas Railroad Commission in Austin last week will be taken up January 12 at Tyler. The decision to continue the hearing was made December 30 when it became apparent that all details could not be finished last week. The Tyler hearing will bring before the commission some 75 witnesses, for whom subpoenas were issued last week. Subpoenas became a part of the process of gaining testimony when some witnesses appeared last week and could not give all information wanted. It was then decided to ask other officials of these companies to appear.

Nominations of purchasers last week indicated that the amount of oil needed from all Texas fields will be around 830,000 barrels daily for the first quarter of 1933. Later nominations may change this total but that is being taken as an estimate of demand. Preliminary nominations last week revealed the following totals by fields:

Preliminary Nominations

Area—	January	February	March
North Texas ...	59,457	60,684	59,668
West Texas	144,063	144,063	144,063
W. Central Tex..	13,297	13,197	13,197
Central Texas ..	57,070	57,070	57,070
East Texas	304,123	305,723	306,323
Southwest Texas	48,476	48,401	48,396
Gulf Coast	112,272	113,272	114,772
Conroe	27,500	30,000	30,500
Panhandle	45,727	43,627	43,627

Additional nominations were received after these totals were prepared but some duplications were found in original figures and some reductions were made. So far reductions and corrections have about balanced with additional nominations, leaving the 830,000 figures as representative of the oil needed from the whole of Texas for the first quarter of the year.

Price Not Considered

The element of the price of oil was omitted from all testimony at this hearing. A statement prepared by the commission gave the reason as a doubt of the legality of this phase of the Texas statute, although the law as written gives the commission authority to consider price in determining the allowable of oil fields.

Questions that will come before the continued meeting at Tyler will include the questions of legality of oil run and similar phases of the controversy between elements within the oil fraternity. The final day of the session at Austin was an effort to get all nominations correctly listed, so the commission will know how much oil can be sold. Statements were taken to the effect that only oil legally produced will be bought and run.

Commissioner Earnest O. Thompson made it clear that purchasers must get nominations before the body at this hearing in order to be allowed to purchase oil.

East Texas producers were pleased with the decision to continue the hearing at Tyler. Through attorneys they have expressed the opinion that proration will be ended in that field unless violations are stopped.

Although the hearing began with the development of the situation in the Panhandle, it became a general discussion when nominations of each purchaser for the entire state were taken up. Shortly the meeting resolved itself into two groups, the East Texas independents, represented by Dewey Lawrence, Tom Pollard and Carl Estes, and the rest of the field.

These East Texas independents had in mind two purposes. The first was the connection of some 300 unconnected wells in the field. The second was the re-allocation of the entire allowable of Texas, as indicated by the nominations, so that the amount allocated to East Texas might be increased while other areas were reduced.

This brought up the question as to the legal right of the commission to take such an action.

When questioned as to whether or not Humble Oil & Refining Company would fulfill the nominations they had made, W. S. Farish, president of the company, stated that they would be fulfilled if "the Railroad Commission writes a valid order, one that will stand in the courts, and subsequently enforces that order."

He indicated that his company would not be willing to abide by their nominations if the commission did not permit them to take the oil from the fields in which they desired to purchase. This, he said, was due to difference in the quality of crude produced in the various districts which were needed to meet his company's requirements.

Other major companies did not follow the lead established by Humble Oil & Refining Company concerning qualifications as to their nominations. In substance they said that this was the amount of Texas

Expert Clash on Conroe Hearing; East Texas Order Expected

Austin, Texas, Dec. 30.—In hearing today before the Texas Railroad Commission following the presentation of data on nominations for proration throughout the state, Alexander Deussen, consulting geologist and petroleum engineer of Houston, testified Conroe field is a non-piercement type of dome in which a gas cap overlies the producing sand, water driven from the southeast.

His testimony went on to the effect that the water table is at minus 4990 feet, top of the gas cap at minus 4700 feet, and that there is from 12,000 to 14,000 producing acres in the field, with an average sand thickness of 50 feet. His figures indicated a yield of 35,000 barrels per acre foot of sand, giving the field a total ultimate yield estimate of 400,000,000 barrels.

Mr. Deussen testified it was his opinion the field was one continuous reservoir.

East Texas operators attacked Mr. Deussen's testimony, claiming similarity between Conroe and East Texas, and suggesting that East Texas overlies a deep-seated salt dome, with the object that East Texas should be prorated on the same basis.

Alpha Petroleum Company, prominent in legal opposition to proration lately, made an effort to prove that Conroe's producing horizon is not a continuous sand, having in mind unlimited production privileges temporarily on a productive lease they own which embraces a well that has been generally classed as an extension well at Conroe, but which Alpha contends is producing from a separate sand. Incidentally, today Alpha Petroleum. Company obtained a superior court order in Austin preventing Judge W. F. Robertson of the civil court from granting orders permitting the railroad commission to interfere with producing Alpha's Keystone Mills 1 in accordance with the company's desires.

"Proration No More Effective Than Prohibition"... *Sinclair*

Tulsa, Okla., Dec. 30.—H. F. Sinclair, chairman of executive committee Consolidated Oil Corporation, made a direct attack on proration in a statement issued here today. Several times Sinclair has indirectly expressed opposition to proration regulations but this statement is being interpreted by some as a possible forerunner of an active campaign either to remodel proration methods or do away with them. Statement was as follows:

"A sense of realities is all anyone needs for an appraisal of conditions in the oil business or in the world. Most people have spent the past three years trying to make themselves believe that there was some formula or turn of some kind that would restore the production, profit and stock quotation figures of the peak of inflation. They have been disappointed.

"The oil business has less excuse than any other for its troubles. The decrease in output has been slight in comparison with any other industry. But artificial restriction known as proration has failed us. We have restriction of a kind but no reward for it. Proration no more effectively restricts than prohibition prohibits. It creates the same army of bootleggers, the same evasions and the same administration evils that prohibition brought into being. We are scrupulously observing the laws and rules of proration but are under no illusions as to its results.

"For the time being the obviously sound principle that the raw material crude price must determine the finished product price has been abandoned. We are at the moment in the vicious circle of successively lower crude prices followed by lower product prices. Carried to its logical conclusion this ends at zero for both crude and refined products. For this reason a reversal of the process is sure to come.

"Our business must be built up from the bottom, not from any artificially maintained level or one that is not in accordance with present day values and conditions. Nations and individuals are not comfortably lifted out of bad times. They must dig themselves out. That is why the process of deliverance seems so slow. Our own particular unit of the oil industry is not looking for any formula for relief, governmental or otherwise. But we are confident of our ability to dig our way out wasting no more time in search of rainbows."

crude needed for their purposes, and they would buy it whether there was proration or not.

Commissioner Thompson assured the assembly that every effort would be made to enforce the orders of the commission through the courts, and that every violator, large or small, would be placed in receivership if the commission could carry out this action.

Thompson said further that he believes the day of violation in East Texas is at an end, due to a change in the temper of the people, and that operators who disregard commission orders will be ostracized and driven out of business in the field.

Statement By Commission

At the outset of the hearing, the commission issued the following statement:

"This hearing is a judicial proceeding and will be conducted as such. All parties interested, if desired, will be heard by sworn testimony, and after the testimony is all in, oral argument will then be presented. All of the testimony and argument will be heard during this trial and not afterward. We cannot prevent letters and messages being sent after the hearing is over, but they will come too late and will not be considered.

"We regard it as improper either orally or in writing for anyone to attempt to influence this commission when it is not in session. It is just as improper and unethical to do so as it would be to try to influence the superior courts of our state by such methods. No form of abuse or improper insinuations reflecting on the character of anyone will be permitted. If it is desired to impeach any witness who has testified, there is a legal way to do that and it must be done in that way only.

"This commission must be controlled alone by the law and the testimony and not be influenced by the will of the majority and any kind of demonstration of approval or disapproval by those present is as much out of place here as it would be in a court room and will not be tolerated.

"Our enforcement officers are unarmed citizens and cannot bear arms. The Texas Railroad Commission is a civil board and does not command an armed force, and must rely on the courts of our state and nation to enforce our orders. The burden of enforcing these orders by penalties falls upon our able attorney general, who is selected by the people of Texas. He is our only lawyer. He has done and is doing all in his power to discharge his duty and enforce the orders of the commission.

"While the law expressly gives the commission the right to consider the price of crude and refined products, we doubt the power of the legislature to do so and we, therefore, have decided not to permit any testimony bearing on the question of price.

"Our proration orders in the past have saved to the oil operators and royalty owners of Texas more than $2,000,000, and the oil industry is the only industry that during the past mad rush for normalcy and prosperity has weathered the storm of depressed conditions and that has tended to lead us aright. It is the only industry that has placed Texas far in advance of any state in this Union in surmounting the gravest situation in all history, and for any cause now to lose control of the situation and not continue to conserve the industry and thereby wreck and ruin thousands of operators and land owners and lose to the nation perhaps one half of this natural resource would be most unfortunate and severe blight upon the fair name of our state, to say nothing of the enormous tax to the state that would be destroyed and the harsh blow to our public school system, not to mention the great loss to Texas University and A. & M. College.

"The East Texas oil field is the greatest oil field on earth and the problems here to be considered are perhaps the

(*Continued on page 28*)

Production *In Line With Requirements* In December

UNDER the favorable influence of the 15-day shut-down of all wells in the East Texas field the latter part of the month, the oil industry placed itself during December in a very satisfactory statistical position, with crude oil production entirely conformable with market requirements.

By virtue of the Texas Railroad Commission's action ordering the East Texas field completely shut in from noon December 17 to the morning of January 1, the nation's production slumped sharply for December as compared with previous months, and even the year's cumulative production trend was influenced appreciably.

Output for December brought the total United States crude oil production in 1932 up to 783,967,550 barrels, which is 7.2 per cent less than the amount produced in 1931. That 7.2 per cent reduction in output represents fair success on the part of the industry in adjusting production to a lowered demand for gasoline and other petroleum products.

Through the East Texas shut-down there was left underground during December about 5,000,000 barrels of oil which otherwise would have been produced and made a market factor. In consequence United States production was only 60,280,190 barrels during the 31 days of December, as compared with 63,368,900 barrels for the 30 days of November. The December output represented by far the lowest production level for any month of 1932. The month's total constituted an average of 1,944,522 barrels daily. The extent of curtailment which the latter figure represents as compared with output in previous months of the year is indicated in the following table:

Month	Average Daily Production
January, 1932	2,190,000
February	2,137,300
March	2,157,050
April	2,228,597
May	2,212,301
June	2,167,753
July	2,158,785
August	2,135,200
September	2,172,223
October	2,137,640
November	2,112,296
December	1,944,522

The December average of 1,944,522 barrels daily represents a decline of 167,774 barrels from the average in November. That reduction represents almost exactly the amount of oil held off the market through the East Texas shut-down, such shut-in production being figured on the basis of a daily average for the whole month of December. Had it not been for that shut-down, therefore, December production would have been at approximately the same level as in November—and the industry would have failed to hold output within the limits dictated by market requirements. For total requirements for domestic crude oil (from production and stocks) for the four months beginning December, 1932, will be only about 2,000,000 barrels daily, according to the latest estimate of the American Petroleum Institute's committee on refinery statistics and economics. With the boon of the East Texas shut-down, however, the industry did succeed in scaling production down in conformity with the indicated requirements.

Since that shutting in of East Texas output was only a temporary, extraordinary development, due to be followed by resumption of normal production in that flush area, it is apparent that the industry must in the new year put forth earnest efforts toward tightening up production restrictions if there is to be a proper balance between output of the raw petroleum and market requirements.

For bringing about the 167,774-barrel decrease in United States daily production in December as compared with November, greatest credit is due Texas by virtue of the East Texas shut-down, but declines were also recorded in the Eastern States, the Rocky Mountain States, Kansas, Arkansas, and Louisiana. California and Oklahoma were the only states moving counter to the general downward

R. W. "Redwood" Taylor, field superintendent Simms Oil Company in the East Texas oil field, standing beneath derrick and facing a late type of well connection adopted for use in the field by the company. Concrete floors to be flush with the ground are also being constructed at each of the company's wells.

Average Daily Production
(In Barrels)

Up in December—

	Oklahoma	California
September	389,185	480,440
October	387,522	475,642
November	383,270	471,406
December	388,405	472,997

Down in December—

	Texas	Louisiana
September	907,703	63,606
October	897,360	63,900
November	864,465	65,500
December	713,312	62,789

	Eastern States	Rocky Mountain States
September	123,890	75,398
October	123,455	75,003
November	120,466	75,183
December	112,898	68,693

	Arkansas	Kansas
September	35,236	98,530
October	33,833	98,923
November	33,789	98,248
December	33,285	92,142

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Kansas	48	23	2	23	12,120	35½	2,856,400	563	354	32	177	171,191	626	35,574,985
California	18	16	1	1	10,575	12	14,662,900	273	197	15	61	162,638	237	178,463,950
Texas	623	496	8	119	2,671,374	171	22,112,680	8911	7265	147	1499	47,953,230	2473	310,645,720
Louisiana	48	17	4	27	5,351	69¾	1,946,460	476	188	33	255	102,668	288	22,585,235
Arkansas	8	1	.	7	290	..	1,031,850	41	4	1	36	650	...	12,434,700
Rocky Mountain States	18	12	1	5	24,031	16¾	2,129,500	162	100	15	47	243,372	161¾	29,202,410
Eastern States	232	132	42	58	4,925	83½	3,499,850	2801	1419	687	695	110,589	1741	44,431,600
Total	1102	765	62	275	2,760,110	911¾	60,280,190	14,312	10,161	1,031	3,120	49,457,509	8,926¾	783,967,550

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The dominant influence which East Texas has exerted on United States field activity statistics is indicated by the fact that of the 14,312 wells completed in the country in the year that has just ended 5836, or 41 per cent, were in East Texas. Those 5836 East Texas completions included 5723 productive oil wells, a remarkably high proportion of successful tests. As compared with the 5836 completions in East Texas in 1932 there were only 3703 in 1931.

That the oil industry was able to achieve a seven per cent reduction of production in 1932 despite a 25 per cent increase in the number of new wells completed was due largely to the concentration of the field work in East Texas, a strictly prorated area.

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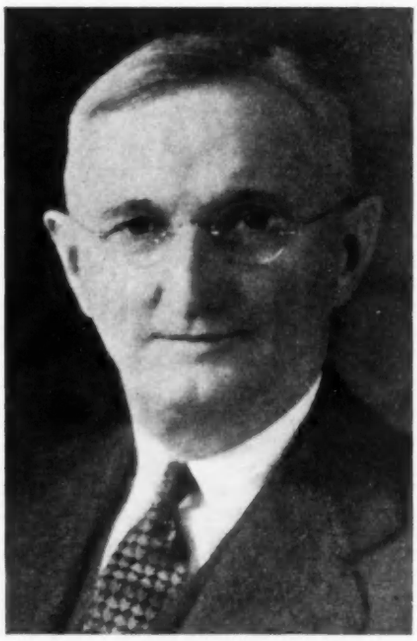
New York.—"The year 1932 has been a testing time for the petroleum industry in all of its divisions, just as it has been for other pursuits," says a New Year statement from C. B. Ames, President of the American Petroleum Institute. "The tests that have been faced by producers, refiners, and marketers of petroleum products have been met with rare courage and fortitude. Profits of course have not been satisfactory, but the petroleum balance sheet for 1932 presents a more optimistic picture than did that of 1931.

"Perhaps the most conspicuous improvement in the position of the industry was in the intangible field of 'better understanding.' It was a year that marked a distinct advance in the treatment by state legislative bodies of a great natural resource and its conservation. Not only did legislators come to have a better understanding of the problems of the industry as it affects the welfare of their constituents, but the people themselves, particularly in producing territories, have shown increasing interest in conservation. Further evidence of a growing spirit of cooperation was shown in the activities of the members of the Oil States Advisory Committee representing ten oil producing states.



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for the gasoline tax is support of the highway system, yet this tax is being diverted to various other uses and is so heavy that a premium is put upon evasion.

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Refiners Building *Cracking Plants To Supply Gasoline* With Less Crude

A STUDY of the economic factors affecting the refining of petroleum, and therefore the production of petroleum, points definitely to a decrease in crude oil runs to stills and increased application of the cracking process during the coming year.

In virtually every instance of new motor car announcements the manufacturers have indicated an increase in compression ratio, which in turn means that motor fuels of higher octane rating will be required, or at least, the better fuels of the regular price type will be required to secure best performance from the 1932-1933 automobile engines. Such gasoline is difficult to produce by skimming methods and as a rule requires either ethylization or blending with relatively large proportions of cracked gasoline.

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The larger companies, many of them advertising and distributing on a national scale, have, for the past two years, maintained a consistent sales appeal based on high octane rating. This has been effective in taking away a large volume of business from the manufacturers producing only straight run gasoline. The results secured, aided by the production of high compression motors has had the dual effect of forcing the larger refining companies into modernizing and expanding their cracking departments and of forcing the owners of straight skimming plants into the cracking field. This combination has resulted in gasoline recovery increasing during the past few years from 40 per cent to 45 per cent, and this figure may well be increased to above 50 per cent in the near future.

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In California, the last refining area to seriously engage in the "race for octane," major expansion programs have been announced by Associated Oil Company, Standard Oil Company of California, Shell Oil Company, General Petroleum Corporation, and as this work progresses other companies including independents, are expected to fall into line.

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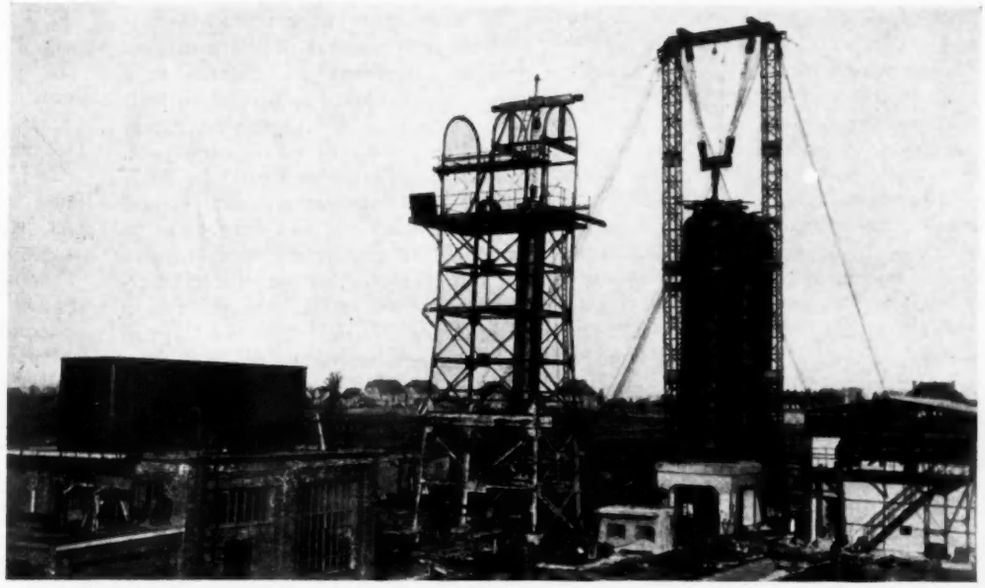

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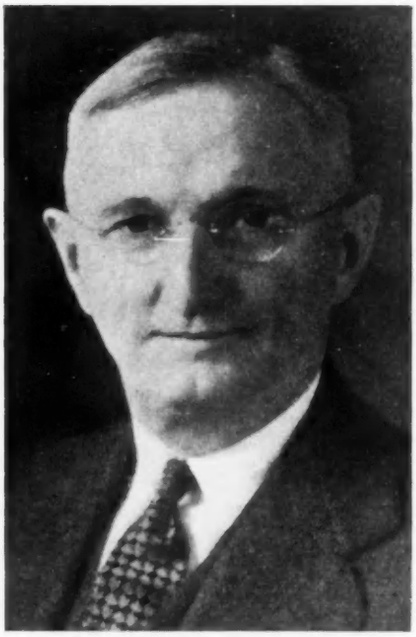

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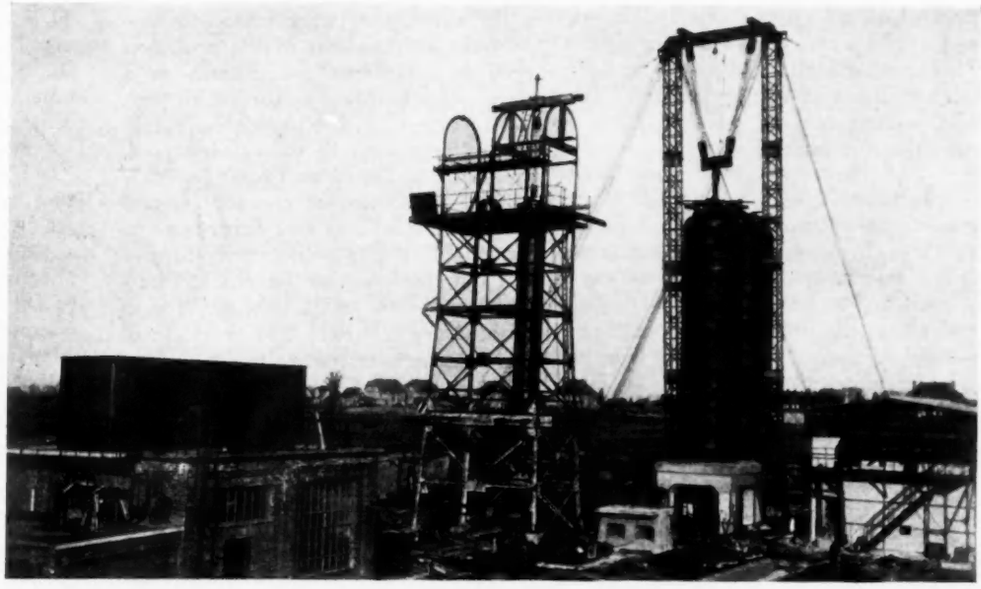


stalled, having a rated capacity of 6000 barrels per day.

General Petroleum Corporation, Los Angeles, has announced plans for a $1,500,000 improvement and expansion program, involving installation of a 5000-barrel cracking unit, Cross type, at its Torrance plant, and other additions and improvements. Reports state that the company's ultimate expansion program may reach $10,000,000.

Shell Oil Company also announced large expenditures in its 1933 budget, totalling $8,000,000 to be spent "largely in the extension and improvement of its refining, production, and distribution facilities throughout the Pacific Coast." The company has refineries at Martinez, Watson and Coalinga, which are to be improved and extended.

Standard Oil Company of California was among the first to announce proposed expenditures for 1933, and recently announced the immediate expenditure of $1,275,000 for modernization and adding to its refining facilities (El Segundo and Richmond) which is part of its earlier announcement involving $3,000,000 for 1933.

Union Oil Company of California has been mentioned in reports as contemplating similar announcement at an early date. Wilshire Oil Company, one of the larger independents, has been receiving bids for a 6000-barrel cracking installation. Other companies are mentioned as studying the situation in California with intent to engage in improvements.

Much of the work in California is to be that of enlarging of cracking departments. This for the reason that most California concerns are burdened with stocks of heavy crude oil, or fuel and gas oil which can be cracked into motor fuel and which will aid these companies in producing the motor fuels of increased octane rating. The program will contribute to reduction of inventories of such heavy stocks, for which but little market demand exists, and aid in securing the maximum yield of quality gasoline commensurate with the production of smaller yields of high grade, salable, fuel oil.

In most instances, if not all, where the cracking department is enlarged, additional steam generating facilities are needed, extentions of cooling systems are required, enlargement of the gasoline recovery systems and stabilization units will be needed, along with enlargement of general piping and tankage facilities.

East of California and in addition to the announcements of Standard Oil Company of New Jersey and Sinclair Refining Company, additional work is reported to be comtemplated by Standard Oil Company (Indiana) (recently completed erection of a 12,000-barrel combination cracking system at Whiting), at other of its refineries in Missouri, Illinois, and Wyoming. Marathon Oil Company has been working on plans for new cracking and other facilities at its Fort Worth, Texas, and Oklahoma refineries. The Texas Company is erecting stabilization systems at several of its natural gasoline plants and is mentioned in reports as contemplating further additions or improvements at several of its refineries, especially in the cracking department. This company is also reported negotiating for the purchase of the Wilburine refinery at Warren, Pennsylvania, which will be modernized and re-equipped. In this district, Allegany Refineries, Inc., plans erection of a 1000-barrel completed plant at Boliver, New York.

The refining industry is consuming a little more than 2,000,000 barrels of crude oil daily. While crude runs have been lowered during 1932, and consequently the total volume of straight run gasoline has also been lowered, the production of cracked gasoline has remained around the average figure of 425,000 to 440,000 barrels per day. Proportionately, therefore, there has been increased utilization of the cracked gasoline during the year, accompanied by a decreased usage of the straight run product. Despite this "see-sawing" of types of motor fuel production required during the year, the fuel oil situation has not been bettered. Late reports show fuel oil stocks approximately the same as at the beginning of the year. This is attributed to the fact that the demand for fuel oil has not been normal, even in proportion to the general depressed demand for all types of commodities. Perhaps such an inevitable condition should have been foreseen by the industry. At least it is now apparent that the industry has reached the realization that fuel oil can not be marketed profitably in comparison to profits available by cracking such oils for the production of gasoline at the expense of crude oil throughput. That, it seems, is now the trend, and the industry will secure greater conversion, increased gasoline yield, by operating under the more profitable scheme of "deeper" cracking.

Injunction Against Eastex Production

Austin, Texas, Dec. 29.—Temporary injunctions were granted Thursday by District Judge W. F. Robertson, restraining the firms of Roberts and Roscoe, and the P & G Oil Company from producing oil in East Texas. The orders are returnable January 4.

P & G Oil Company operates the "Fortress of Gladewater," a well which commission officials have been unable to gauge, since it is not accessible to their agents except by search warrant.

Mid-Continent Group Pledges Support *to Proration Work*

Tulsa.—After electing E. R. Filley, The Texas Company, president of the Oklahoma-Kansas Division, Mid-Continent Oil and Gas Association, the executive committee of that organization adopted the following resolution:

"Resolved, that we continue to support the enforcement of the proration laws of Oklahoma and Kansas as a means of preventing waste and protecting the co-equal and correlative rights of the producers of oil in each pool, and that the Statewide Proration Committee, as heretofore constituted, and with such additions and changes as to personnel as may be necessary to give fair representation to the various interests, large and small, be continued in an advisory capacity. The president of the division is instructed to appoint the members of this committee."

Thereupon, President Filley appointed the following Statewide Proration Committee, of which he, according to custom, becomes ex-officio chairman:

E. R. Filley, The Texas Company, Chairman, Tulsa.

Alvin Richards, Pure Oil Company, Tulsa.

Burdette Blue, Indian Territory Illuminating Oil Company, Bartlesville.

Wirt Franklin, Wirt Franklin Petroleum Corporation, Oklahoma City.

E. J. Nicklos, Continental Oil Company, Ponca City.

J. S. Sidwell, Sinclair-Prairie Oil Company, Tulsa.

C. C. Herndon, Skelly Oil Company, Tulsa.

C. H. Lieb, Carter Oil Company, Tulsa.

H. B. Fell, Simpson-Fell Oil Company, Ardmore.

J. Steve Anderson, Anderson-Prichard Oil Corporation, Oklahoma City.

George Jaques, Stanolind Oil & Gas Company, Tulsa.

Wm. N. Davis, Phillips Petroleum Company, Bartlesville.

A. M. Blow, Amerada Petroleum Corporation, Tulsa.

H. G. Ellis, Wiser Oil Company, Bartlesville.

Rush Greenslade, Gypsy Oil Company, Tulsa.

MEN IN THE INDUSTRY'S NEWS

E. R. FILLEY

E. R. FILLEY of The Texas Company has been chosen to direct the activities of the Kansas-Oklahoma division of the Mid-Continent Oil & Gas Association.

Mr. Filley is manager of the Oklahoma-Kansas-Kentucky division of the production department of The Texas Company and lives in Tulsa. He has been connected with The Texas Company for more than 16 years and is well known throughout the Mid-Continent field where he has been active in the affairs of the Mid-Continent Oil & Gas Association for some time. He succeeds to the position made vacant by the resignation of Gen. Baird H. Markham of Continental Oil Company of Ponca City, Oklahoma, who has gone to New York to head the new Industries Committee of the American Petroleum Institute.

D. W. MOFFITT, widely known in refining circles of the Mid-Continent and Middle West died at Tulsa, December 26.

Mr. Moffitt who was 71 years old retired three years ago as an active official of the Mid-Continent Petroleum Corporation due to ill health but has continued as a director of the corporation. At one time he was vice president in charge of refining and marketing, having been connected with the organization for many years. He also was active in the affairs of the various marketing organizations, appearing frequently on their programs.

Mr. Moffitt entered in the oil business in 1908 as manager of a small refinery in Kansas. He is survived by his widow, one daughter and one son.

DAN B. KINIRY, field superintendent for Sun Oil Company in the Kilgore section of the East Texas oil field, has been transferred to the Conroe field in South Texas, where the company is confronted with considerable development work on proven tracts. W. F. Hughes, former superintendent for the company in the Refugio, Texas, area, will be assistant to Kiniry. Earl McClure succeeds Kiniry at Kilgore.

JIM B. HADEN, superintendent for The Texas Pipe Line Company in West Central Texas, has transferred headquarters from Fort Worth to Wichita Falls, which is the division operating office for the company for the above district and the North Texas-Panhandle areas, with O. R. Burden in charge.

E. B. REESER, head of Barnsdall Oil Corporation, has been visiting company offices in California.

GRAYDON OLIVER, well known Los Angeles petroleum engineer, will instruct a special class for University of California, Extension Division at Los Angeles, the first course to be on "Natural Gas Engineering."

WALTER ENGLISH, geologist for Superior Oil Company at Los Angeles, is looking over properties in Texas.

CLARENCE TIFFT, general purchasing agent for Netherlands Colonial Petroleum Company, a subsidiary of Standard Oil Company of New Jersey in the Dutch East Indies, has been visiting in California. He will spend some time in the Mid-Continent during the winter.

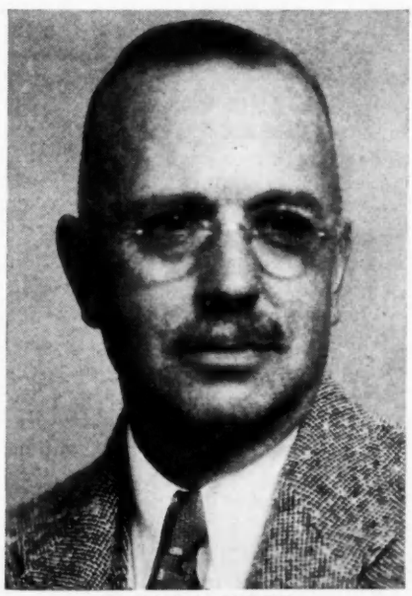
MORTON SARGENT, production man for Burma Oil Company, has returned to Upper Burmah after an extended visit in California.

A. T. PROUDFIT, assistant general superintendent for Lago Petroleum Company, was notified before Christmas of the death of his father at Los Angeles. The senior Proudfit had been buying presents for his son and was the victim of a heart attack on one of the main streets of Los Angeles.

JOHN D. LAWRENCE, district manager for Tnemec Paint and Oil Company of Kansas City, has been attending to business in California.

R. VAN A. MILLS, vice president and general manager of the Hudson's Bay Oil & Gas Company in Calgary, Alberta, Canada, has been appointed to the position of chief production engineer in Continental Oil Company's general offices at Ponca City, Oklahoma. Mr. Mills will also retain his position with the Hudson's Bay Oil & Gas Company, a Conoco subsidiary, and direct its activities from Ponca City.

Mr. Mills was born in Washington, D. C., where he also received his elementary education. Since 1906, when he was graduated from Columbia University with an Engineer of Mines degree, he has accumulated much valuable experience in his profession both in the United States and abroad. Immediately after his graduation and until 1910 he was engaged in a number of miscellaneous mining activities in the western United States and Mexico. In 1910, in response to an invitation from the American legation at Pekin, now Peiping, China, he took charge of the Chinese Imperial School of Mines. In 1912 he returned to the United States to participate in petroleum geology work for the U. S. Geological Survey in the Appalachian and Rocky Mountain fields. In 1918 he took a position as petroleum technologist and engineer for the U. S. Bureau of Mines. From then until 1926, when he was placed in charge of oil recovery investigations for the Bureau of Mines with headquarters in Bartlesville, he covered a wide territory, including the Appalachian, Illinois, Gulf Coast, Rocky Mountain and California fields.



R. VAN A. MILLS

{ Second of a Series }

Argentine Petroleum Industry *and the Effects of the* Nationalization Policy

MARK C. MALAMPHY
Rio de Janeiro, Brazil*

WHEN the Bureau of Mines first discovered petroleum in Comodoro Rivadavia in 1907, the government immediately declared all the surrounding area a national reserve zone and not available for concessions. A few years later, in 1910, a new decree restricted this zone to 5000 hectares, and a few months later another decree created a special committee for the exploitation of the reserve zone. This committee continued to function for a number of years until about 1921 or 1922, it was reorganized under the name of Yacimientos Petroliferos Riscales, or to give it the name by which it is more generally known in the United States, "The Argentine Government Oil Fields."

The rapid development of the Y. P. F. since 1922 is in great part due to the former Director General Enrique Mosconi, a very able man who directed the destinies of the organization until the time of the fall of the Irigoyen government in the revolution of 1930.

The present organization is almost identical with that of 1922 and may be described as follows: Yacimientos Petroliferos Fiscales is an autonomous government department, under the jurisdiction of the Minister of Agriculture. It is directed by a board of seven members, appointed by the president with the consent of congress. The chairman of the board is titled the director general and is the executive head of the organization. Two other members are titled assistant director and acting director and administrate in case of absence of the director general. The other members meet as a council at certain specified dates, or when called on to decide important questions. A forum of not less than four members is required to make the council legal.

Dirección General de los Yacimientos Petroliferos Fiscales, as the main office is termed, is located in a new modern building in the down town section of Buenos Aires, adjoining the Department of Agriculture Building. In this building are all the administration offices, the commercial, technical and geological departments and other sub-divisions.

The internal organization of Y. P. F. is similar to that of any commercial company of comparable size, with the possible exception that there appears to be an excess of personnel and many more delays due to governmental red tape.

After Dirección General, the most important unit of Y. P. F. is the Administración of Comodoro Rivadavia. This branch controls the exploitation of Comodoro Rivadavia field. It is much more efficiently organized, and although it also has its share of red tape, the process of transmission of such papers is much more rapid. This administration operates an electric light plant, gas plant, refinery, pipe lines, drills and produces wells, has its own shops and is more or less complete in itself. The petroleum produced is stored on its own tank farm, and is loaded on the tankers for shipment to the larger government refinery at La Plata. Transportation by tanker is under the control of the Dirección General in Buenos Aires, the responsibility of the administration ending with the delivery of the crude to the tankers.

The Refinery at La Plata is classed by Roy E. Leigh[4] as a 13,000-barrel topping and cracking plant. It has been in operation since the middle of 1926, and is very efficiently managed. The refined products from this refinery are sold through 3098 curb side gasoline pumps for the retail sale of gasoline and also through private dealers who have contracts with Y. P. F., and who must sell at the established price.

The 2200-barrel refinery at Comodoro Rivadavia, the 700-barrel plant at Plaza Huincul, and the crude refinery at Salta, of unknown capacity, are all operated by the respective administrations of these zones.

The administration of Plaza Huincul is organized along the same general lines as that of Comodoro Rivadavia, but is much smaller and less important. Crude produced in Plaza Huincul, in excess of the capacity of the refinery there, is shipped to Bahia Blanca by rail, and from there transported by tanker to La Plata. The same tanker also transports some crude to Bahia Blanca for the account of Cia Ferrocarrilera in Comodoro.

Administración de Salta, which controls the government interests in this northern province, is even smaller than that of Plaza Huincul. This relatively new field office has yet to orient itself in the ways of efficient operation. Although the main producing field of the region is at Vespuccio, and the newly opened Tranquitas prospect is only a few miles farther south, administration headquarters have been established in Embarcación some 100 kilometers to the south of Vespuccio. It is understood that the offices were located at this point on the expectation of the development of production on several structures to the southwest near the town of Oran. The location has not proved very practical. Bad to indifferent automobile roads, inconvenient train schedules and lack of telephone facilities render communications difficult and entirely defeat the purpose of the central location. Since production has yet to be developed near Oran, the Vespuccio-Tranquitas region is much more important than the southern areas and delays in communication between the producing areas and the administration office detract greatly from efficient operation in these fields.

The geological work of Y. P. F. is under the direct control of the Dirección General in Buenos Aires. Geologists are assigned to the various administrations for the purpose of studying the sub-surface formations, but they remain under the control of Buenos Aires. The field geologists who are studying the regional geology of the areas report directly to Buenos Aires. This arrangement does not contribute to the most efficient work. There does not exist that "esprit de corps," so necessary for the best cooperation between two independent divisions of the same organization. The Geophysical Commission under charge of the writer also depended directly to the Chief Geologist in Buenos Aires, and on various occasions, considerable difficulties were experienced in obtaining the cooperation of the geologists working in the same region. Ordinarily, it was necessary to write to Buenos Aires, explaining what information was desired, and requesting them to instruct the geologist to furnish the necessary data, if it was available.

Yacimientos Petroliferos Fiscales does not operate any extensive pipe lines. Small, short lines are utilized for the collection of the petroleum and transportation to the storage tanks or the shipping points, from where it is transported by ocean tanker or by rail. The government fleet of tankers, operated by Y. P. F. consists of seven ships having a total net tonnage of some 47,000 tons. Four of these ships are in constant service between Comodoro Rivadavia and La Plata, making the one way trip in slightly less

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than 100 hours. The other three make occasional trips to Comodoro Rivadavia and Bahia Blanca but are more commonly utilized in transport service on Rio de la Plata and Rio Parana, between La Plata, Buenos Aires, Rosario, Santa Feé and other ports.

This fleet is only slightly more than adequate for the present government production in the Comodoro Rivadavia area, and if any appreciable quantity of new production should be discovered, additional ships would be required, or it would be necessary to construct a long pipe line.

The magnitude of the operations of the Yacimientos Petroliferos Fiscales is shown in Table 10, taken from a recent message of the Minister of Agriculture to the Congress.[9]

TABLE 10
Some Statistical Data on the Yacimientos Petroliferos Fiscales for the Year 1932

Production, 1932 (Estimate)

Wells		Cubic Meters
1200	Comodoro Rivadavia	730,000
130	Plaza Huincul	121,500
20	Vespuccio-Tranquitas	35,000

Transport

Seven tankers, total capacity 47,000 tons net. Various tugs and launches. Short pipe lines and numerous railway tank cars.

Refineries

Four refineries with total capacity of 2770 Cu. M. per day (17,400 barrels).

Refined Products Sold in 1931

Gasoline . .....237,356 cubic meters
Kerosene . ..... 22,211 cubic meters
Agricol (tractor gas) 17,692 cubic meters
Fuel Oil .....473,539 metric tons

Storage Facilities

	Cubic Meters
Eight storage plants for refined production. Total capacity.....	169,710
Three storage plants in construction. Total capacity	24,250
Four tank farms for crude at fields and refineries	363,423

Exploration Studies

Nine geological and topographical commissions studying regional geology.

Two geophysical commissions studying sub-surface structures.

Exploration Drilling

11 Rigs to drill 18 tests in Comodoro Rivadavia area during 1932.
3 Rigs to drill 4 tests in Plaza Huincul area during 1932.
4 Rigs to drill 4 tests in Provincia de Salta during 1932.
2 Rigs to drill 2 tests in Province de Mendoza during 1932.
6 new rigs ordered for explorations in Salta. To be in service in 1932.

Personnel Employed

1,522 Technical and administrative employes in service during 1932.
5,343 Skilled and unskilled laborers in service during 1932.

Financial Data

Expected receipts for the year 1932, 78,563,829 pesos (Approx. $19,640,957 U. S.)
Expenditures for materials during 1931, 13,293,384 pesos (Approx. $3,323,346 U. S.)

Private Companies Operating in Argentina

Although Yacimientos Petroliferos Fiscales is by far the outstanding producing company in Argentina, total production of private companies amounts to over 40 per cent of the petroleum produced.

Compañia Astra

"Astra" Compania Argentina de Petroleo, Sociedad Anonima, was the first independent organization to enter the industry in Argentina. It has produced in the Comodoro Rivadavia area since 1916, and is today responsible for an appreciable percentage of the production of that field. This company also owns a small concession in the Plaza Huincul district but its production there is as yet insignificant.

Astra operates a 3500-barrel refinery at Comodoro Rivadavia and another in Campana. The latter is operated under the name of the subsidiary company "Itaca" Compania Argentina Para la Elaboracion de Productos Petroliferos. Astra operates a few small tankers for transport of crude and refined products, and a small pipe line to the loading dock near Comodoro Rivadavia.

Through Itaca, Astra purchases the production of Compania Industrial y Comercial de Petroleo (Anglo-Persian) and Compania Petrolifera Argentina "Solaño." It owns extensive storage facilities at Comodoro Rivadavia as well as in Buenos Aires and Campana.

The production of the Comodoro Rivadavia concession has passed its peak, and it is not known that the company has any other prospects except the small concession at Plaza Huincul.

Railway Companies

Compañia Argentina de Petroleos, Ferrocarrilera is the joint property of several of the British-Argentine Railway Companies. It was the second private company to establish production in Argentina. It produces from a prolific concession adjoining the old government reserve in Comodoro Rivadavia. It ranks as the second most important producing company.

It operates a modern refinery and gasoline plant on the Comodoro Rivadavia

lease, selling the refined lighter derivatives to Y. P. F. The fuel oil produced is transported to Bahia Blanca by the Yacimientos Petroliferos Fiscales tankers for distribution among the various railway companies owning stock in the oil company.

Maximum production was obtained by this company in 1929, when it averaged about 5000 barrels per day. Production is declining as the reserve becomes exhausted, and no new prospects are available for development.

Anglo-Persian Subsidiary

Compañia Industrial y Comercial de Petroleo purchased a previously granted concession and began operations in Comodoro Rivadavia in 1922. This lease has proved the most prolific of any in the field but is very small in area. Y. P. F. drilled at all possible locations surrounding the lease and probably affected the total recovery to a considerable extent. The peak was reached during 1927, and since that time production has fallen off considerably. The concession is now completely drilled, and since the company does not own any other prospects except a small lease in Plaza Huincul, its future is dubious.

*Potential value of Shell holdings indicated by reported production of 247,806 metric tons for 1931 against 9980 tons for 1930. "Shell Statement" Oil Weekly, June 13, 1932, p. 13.

Royal Dutch-Shell

The Royal Dutch Shell is represented in the Comodoro Rivadavia district by five subsidiaries, Diadema Argentina, S.A. de Petroleo, "Brillante" S.A. de Petroleo, Antorcha Argentina S.A. Petroleo, "Perla" S.A. Petroleo and "Rubu" S.A. Petroleo. Production has been obtained on each of these concessions.

Shell was either exceptionally lucky in the choice of concessions, or its geologists proved to be much better informed on the complicated conditions existing in this region than those of any other organization. Present production figures are not impressive, but operations have been practically suspended during the period 1929 to 1930, awaiting the decision of the government relative to the construction of a refinery in Buenos Aires. With the governmental approval granted in the latter part of 1930, after the overthrow of the Irigoyen government, a considerable increase in activity appeared.

The total area of Shell concessions amounts to approximately 13,000 acres and contains some of the most promising territory of the region.* The fields are located 20 kilometers in from the coast and this location facilitates the transport problem considerably.

Two new Y. P. F. pools, Cañadon Perdido and Escalante, are results of offset wells drilled across the line from production discovered by one or the other of the Shell subsidiaries.

Petroleo de Challacó

Leopoldo Sol was one of the officials of the government petroleum organization before the time of the creation of the Y. P. F. in 1921. After leaving the government service he organized a small company, Sociedad Petroleo de Challaco (Neuquen) Lda., in Comodoro Rivadavia, and not enjoying particular success in that region, transferred his activities to the Plaza Huincul area. In the latter field, the company has succeeded in developing a moderate production, but its operations are of far less importance than those of Y. P. F. and Standard Oil Company who are the main producers of the region. The production of this company is estimated at some 10,000 barrels per month.

The Standard Oil Co. Sociedad Anónima Argentina

Standard Oil Company drilled several wells in Comodoro Rivadavia about 1922, but not finding exploitable production, soon abandoned the field. A short time later in August, 1923, it obtained exploration concessions on 225,000 acres in the Provincia de Salta, of which 75,000 acres were to be permanently granted for exploitation if petroleum was discovered.[28] This company was also successful in purchasing concessions in the Plaza Huincul area outside of the government reserve.

Standard Oil Company discovered its first production in Plaza Huincul in 1926, and its first Lomitas well was completed the following year. Since the date of the discovery well in Plaza Huincul, the company has increased its production in this field by a considerable percentage. It was not long before its total production exceeded that of Y. P. F., even though the latter had already been operating for several years. Standard Oil Company production in Plaza Huincul is appreciably greater than that of all other interests.

Development of the Lomitas and other concessions in Provincia de Salta has been retarded by court litigations. The Salta concessions of Standard Oil Company had been granted by an interventor, appointed by the federal executive power to govern the province during a period in which the elected executives and congress were disbanded and the constitution suspended. The interventor created an Inspection of Mines, which was charged with the study of applications for concessions, and his rulings were appealable to the minister. Concessions granted under this arrangement had been at least passively approved by two later elected governments, but in 1929, the Salta government published a decree in which they stated that the concessions had been illegally granted and were thereby cancelled. Suit for possession was begun, and things looked rather black for Standard Oil Company.

The Lomitas case brought out several

Yacimientos Petroliferos Fiscales Test at Campo Duran, Salta

interesting points. Standard Oil Company claimed that it had operated under rights granted by what it considered a legal government authority, and denied the right of the Salta government to cancel the concessions. The company brought suit against the Salta government in the supreme court, claiming non-constitutionality of the decree. The supreme court accepted the case as within its jurisdiction, and after a long drawn out discussion of the matter, finally decided in favor of Standard Oil Company.

The whole case is treated in the references given in (1) and in the final decision handed down on March 14, 1932, (Fallo de la Corte Suprema) (1-b), declared that the interventor was the supreme authority in the state at that time, and as such had full powers to create such boards as he saw fit. Further that the decisions of any such boards in matters actually coming under their jurisdiction were legal. Since retroactive laws are not permitted in such cases, the concessions of Standard Oil Company could not be cancelled by the Salta government, and the company had full rights to continue working, subject always to the law and other regulations. The Salta decree was declared as unconstitutional and the case in the Salta courts was withdrawn.

Production of Standard Oil Company in Salta had been restricted by these legal difficulties, but now that it is free to continue its exploration and exploitation work, it is probable that activities will increase.

Other Companies Operating in Argentina

There are a considerable number of other companies engaged in the petroleum industry in Argentina. Some of these are only in the retail business, or are operating refineries using imported crude. Those not mentioned here, but which are actually producing petroleum, are of little importance and need not be considered.

The nationalization policy of the Argentine government began with the discovery of petroleum in Comodoro Rivadavia. It has been developed along three lines: government participation, reserve zones, and import duties. Organization and operation of the government petroleum organization known as the Yacimientos Petroliferos Fiscales has already been discussed.

The first reserve zone of 1907, comprising all that area included within a radius of 25 kilometers of the town of Comodoro Rivadavia, was promulgated in order to prevent speculators from obtaining concessions to be held and later sold. It was intended to function for such time as might be necessary for the government to determine a proper course of action which would aid in development of the industry.

In 1910, these promises were fulfilled by reduction of the reserve to an area of 5000 hectares and creation of a government department for exploitation of this reserve. The released area was thrown open to concession by private capital, and the concessions granted include those on which private companies are producing today.

Just why the government changed its mind in 1913 is difficult to determine, but the result was the extension of the reserve zone in all directions, respecting, however, the rights of all companies who had already obtained concessions, or whose applications were in the process of being approved.

In 1924, after Y. P. F. had been reorganized and placed under the direction of General Mosconi, and after promising production had been obtained at Plaza Huincul, a new reserve decree was published which included practically all the federal land that showed any promise of ever producing petroleum or gas. However, in this case also, concessions which had already been granted in the Plaza Huincul area, were respected in all the rights previously granted. The immensity of this reserve area is seen on examination of the map shown in Figure 3. It includes all the territory of Neuquen, and parts of territories of La Pampa and Rio Negro. At the same time the Comodoro Rivadavia reserve zone was further ex-

tended to the west and to the south, including a part of the territory of Santa Cruz.

In 1927, a new decree extended the Comodoro Rivadavia Reserve Zone to the Chilian frontier, and another decree of 1930 declared a reserve of all the far southern territory of Tierra del Fuego, which is a much colder region than its name implies.

Creation of the Tierra del Fuego reserve was evidently based on the reports of promising oil seeps which had been discovered in Chilian territory below the Straights of Magellan, and the known oil seeps near the Ushuaia penitentiary on the southern side of the Argentine part of the islands.[18]

A recapitulation of these various reserve decrees is found in official bulletin of the Y. P. F.[19]. There are several typographical errors in this publication, and the author has tried to give the more or less correct location in the figures already referred to.

The federal government has reserved for itself practically all the promising territory coming under its jurisdiction. It has only neglected the territories of El Chaco, Formosa and Missiones, areas only partly explored, and in which no important geological studies have been made, and the mountainous "Los Andes."

The federal government has not been alone in this policy of declaring reserve zones, available only for exploration and exploitation by government agencies. Provincia de Salta, in a decree promulgated in 1924, followed the lead of the federal government by declaring reserved, all that area north of parallel 25° 30′ S latitude and east of the meridian 65° 30′ west of Greenwich. Since the Standard Oil Company concessions had been applied for before the publication of this decree, they were exempt from it.

It is understood that the Provincia de Jujuy has also declared a reserve zone, but no data relative to its extension is available.

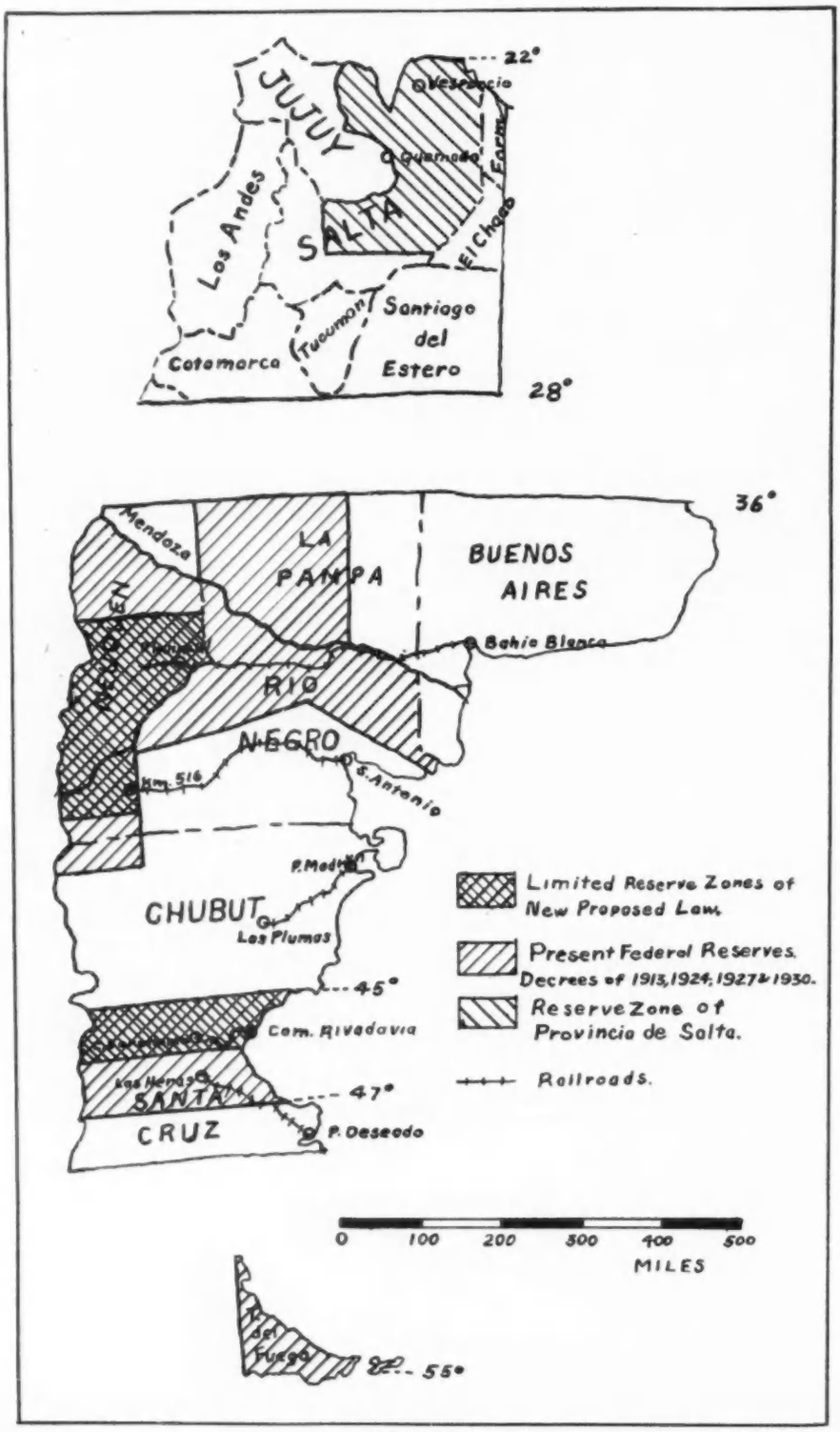

FIGURE 3

Sketch showing extension of Argentine reserve areas and the new reserve areas provided for in the proposed petrolum law

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This is the second of a series of articles on Argentine by Mr. Malamphy. The third will appear in an early issue.

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(See also references, Page 18, The OIL WEEKLY, December 26, 1932.)

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Preliminary Experiment in Oil Recovery

Core Samples *Approximate Sand In Place in* Water Drive Study

K. B. BARNES*

THE successful application of secondary recovery methods in some Pennsylvania oil fields, coupled with present economic conditions, has brought about a new appreciation of the importance of these methods of petroleum recovery. A lowered price structure makes more efficient production necessary. This may in part be attained by increased recovery of petroleum at a favorable cost. It should be emphasized that this does not mean increased production, but an increased yield from a given lease. Secondary recovery methods result in more complete utilization and conservation of petroleum resources.

Because of the high quality of Pennsylvania crudes for manufacture of lubricants the importance to the state of secondary recovery methods cannot be overestimated.

Their importance in other fields will increase in the future when the era of flush production is over and increased recovery of oil for existing pools is demanded.

Three methods for secondary oil recovery are available (1) air or gas repressuring, (2) water-flooding, (3) oil mining. Only the first two are considered of commercial importance in the United States at this time. There is, however, at least one case of an oil mining development being considered in Pennsylvania, but no results are available upon which the commercial possibilities of the method can be judged.

Air or gas repressuring and water-flooding have been called "secondary" recovery methods in eastern terminology, although in Western fields air or gas repressuring are considered production practices that may be applied at any time during the life of an oil field. A brief review of the history of the development of the Appalachian fields which produce Pennsylvania Grade crude oil will emphasize the realization that the natural reservoir energy of these fields long ago had diminished to negligible proportions and the importance of repressuring or water-flooding in supplying additional energy to promote the recovery of large quantities of oil remaining in the reservoirs. Most of the fields were developed in the latter part of the nineteenth century. Many of the wells flowed initially, all wells were pumped finally, and many of the wells long ago declined in production to an economic limit where pumping was no longer profitable. Such wells were abandoned, often without any attempt to plug them. A great amount of gas and the accompanying energy was lost in these fields due to the unperfected methods of cable tool drilling and the crude production practices in use at that time.

Water-flooding was discovered accidentally about 1891 as a result of the encroachment of water from upper sands into a lower oil sand in wells that had not been plugged properly. This caused a natural water drive which sometimes increased the oil production of neighboring wells. Water-flooding was practiced haphazardly for some time after this discovery by turning water into old wells. The result was the formation of a hydrostatic head, equal to the depth of the well, on the face of the sand. In 1921, positive displacement was employed to create additional head, or pressure on the sand face. Centrifugal pumps are now being used on some water-flood properties. Pressures as high as 2000 pounds per square inch have been used.

In 1921 water-flooding of the Bradford, Kane, and Haskell sands were authorized by statute in Pennsylvania, although it was later found that the Kane sand could be flooded with little success (certainly not commercially). Water-flooding generally is practiced successfully in most of the oil fields of New York State. The introduction of compressed gas or air into the sand was used for increasing recovery of oil in many Pennsylvania fields that could not be water-flooded.

It should be noted from the foregoing discussion of production practice in the Appalachian fields that these methods ordinarily have been applied to fields approaching or at the state of economic depletion, in an effort to obtain a part, at least, of the oil remaining in the reservoir. In these fields there is no opportunity for pressure maintenance or restoration of the gas energy to the producing horizon. A new driving medium must be supplied for the oil. Confronted with this condition in the various Pennsylvania oil fields, data indicating what fluids can be used as driving agents and a measurement of their success should be of interest and importance. It is not known how much additional oil has been made available by the use of compressed gas or air, but it has been estimated[1] that the water-flooding process has established a reserve of about 600,000,000 barrels of oil in the Bradford-Allegheny fields, including over 100,000 acres.

Oil Recovery Research

Oil recovery investigations have been carried on for several years by the United States Bureau of Mines, by the United States Geological Survey, by various oil companies, by the University of California, the University of Oklahoma, the Colorado School of Mines, the Pennsylvania State College, the University of Pittsburgh, and by investigators in private laboratories.

Research in oil recovery to date includes considerable work on the following problems: the flow characteristics of oil under various conditions, the relative propulsive efficiencies of compressed air and gas, the natural flow of oil due to the propulsive energy of the gas vaporizing from the oil and expanding, repressuring, pressure maintenance, water-flooding, solution flooding, water encroachment. The majority of these studies have been made using loose sand packed in an experimental apparatus (consisting principally of a "flow-tube,") in such a manner as to duplicate as closely as possible the uncon-

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Presented at the Second Penna. Petroleum & Natural Gas Conference, The Pennsylvania State College, State College, Pa., May 21, 1932. Published by permission of the Director of Mineral Industries Research.
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solidated or relatively incoherent sandstones that occur commonly in oil fields west of the Mississippi River.

An experimental set-up of this type does not even approximate actual field conditions in the Appalachian region. Here the petroleum is contained in a coherent, tightly cemented, consolidated sandstone. The usual flow-tube type of apparatus is not suitable for studying methods of recovery which are to be applied in Pennsylvania because of the characteristics of the existing reservoir rocks. These factors of compaction and cementation which must not be ignored in determining results for field application cannot be easily corrected for. For these reasons average specimens of various Pennsylvania oil sandstones, as represented by 2¼-inch diamond drill cores taken from the selected horizons, were used in the investigation which this paper describes. The purpose of the investigation was to study in the laboratory the following problems dealing with the application of secondary recovery methods in obtaining additional oil from sandstone cores: (1) The determination of the relative effectiveness of various driving fluids, (2) The determination of the oil recovery factors of these sandstones, (3) The determination of the effect on oil recovery of such physical properties of the oil sandstone and of water contained therein, particularly those that would react with certain driving agents.

This paper is a progress report concerned chiefly with the results obtained on the first two problems.

The Sloan Zook Company, Forest Oil Corporation, Olean Petroleum Company, Brundred Oil Corporation, Petroleum Reclamation Company, and National Petroleum Company kindly furnished the cores from wells and the samples of crude oil used. The author expresses his gratitude for the cooperation of these companies.

Oil Recovery Apparatus

A suitable device for holding the sandstone core during a recovery test was required. This device had to be so arranged that a core sample could be impregnated homogeniously with oil to a determinable percentage, that no leakage or by-passing around the sample occurred when pressure was applied, and that the sample could be easily removed from it after a test. The first tests made with cores mounted inside of steel nipples did not meet the above requirements, and in addition the flow through the sample was across or at right angles to the bedding plane.

Since[2] the coefficient of permeability of various Pennsylvania oil sandstones is often lower across the bedding plane than parallel to it, it was essential to set-up the apparatus in such a manner that field conditions would be simulated. A core-holder held the sample in a vertical position so that any pressure that was transmitted to the sample was parallel to the bedding plane of the sample. The movement of oil and driving fluid through the sample was parallel to the plane of deposition, and the foci of the drives were in a central inside area, as is common in five, seven, or nine spotting in water-flooding operations.

The sandstone core specimen was cut to a length of 2-2¼ inches and a one-inch hole drilled through the center by means of a diamond drill. The ends of the sample were made parallel to each other and smoothed to a natural finish by turning the piece in a lathe. The sample was placed on the core-holder and held tightly by gaskets and a large nut.

The general arrangement of the rest of the apparatus is shown in Figure 1. Essentially, the apparatus is divided into two parts, the saturation side and the recovery side. The saturation and recovery manifolds are connected through a valve and are arranged for the admittance of compressed air or gas, and hot and cold water.

Tank A is for the storage of the liquids used in testing. The pressure of the fluid was controlled accurately by needle valves. The pressure gauges were calibrated with a dead weight gauge tester. The recovery side of the system was insulated with one-inch asbestos pipe covering and was wrapped with sheeting, to minimize heat losses and gains. It was not found necessary to insulate the saturation side.

[2]Barb, Mineral Industries Experiment Station, Bull. 9, 48 (1930).
[3]Barnes, Mineral Industries Experiment Station Bull. 10 (1931).

Procedure

The porosity of the sample was determined by the acetylene tetrachloride saturation method[3], using the plug from the center of the sample. The cored samples were thoroughly boiled in carbon tetrochloride to extract the bituminous matter which they contained. The volume of the core sample was determined by the displacement of liquid in a graduate. The pore volume of the sample was calculated from these data.

The samples were fastened securely in the core-holder attached to the saturation side of the apparatus, and the carbon tetrachloride or other solvent filling the pore spaces blown out by compressed air. Sometimes petroleum ether or carbon bisulphide was used to hasten this process of cleaning. The dried samples were dismounted, weighed, and replaced.

The annular space above the core-holder was filled with a selected oil through the openings at E, and forced through the sample by means of compressed air. An initial pressure of 150 pounds per square inch was applied to insure thorough wetting of the sand by the oil in a short time. After the flow of oil had been established through the sandstone, the air pressure was gradually reduced to atmospheric. The time required for complete saturation of the sample varied from 15 minutes to three hours, depending on the texture of the sandstone and the properties of the oil.

The oil in a reservoir contains gas dissolved at reservoir pressure, which in the case of a majority of the oil fields in the Appalachian region, is generally about atmospheric. Fresh crude oil of this nature was used in the experiments to approximate reservoir conditions. The oil saturated sample was dismounted from the core-holder, surplus oil removed from the surfaces, and the sample weighed. The amount of oil contained in the sample and the per cent of saturation were calculated from the data taken and the specific gravity of the oil at the temperature of the test.

Typical Calculation for Preparation of a Saturated Sample

Sample No. 16 Second Venango Sand, Oil City, Penna.
Porosity 17.6 per cent.
Displacement volume 102 c.c.
Pore volume 18.0 c.c.
Oil used:

Crude from Second Venango sand, Oil City, Pa.
Specific Gravity: 0.844 at 70°F., 35.5° A.P.I. (60°/60°).
Weight of oil (grams) = Volume of oil (c.c.) × Specific Gravity of oil

Weight of sample, oil wet = 243.5 g. 13.5 = 16 c.c. of oil
Weight of sample, dry = 230.0 g. .8441 in sample
13.5

The saturated samples were placed in clean core-holders and securely tightened; the core holders were assembled within their respective pressure receptacles by bolting the flanges together, as shown in Figure 1. New gaskets were used for each test to prevent leakage around the ends of the core-sample. The temperature of the flooding liquid in tank A was maintained 5°F. higher or lower than the temperature of the test, depending on whether the test temperature was higher or lower than room temperature. By draining off part of the liquid and admitting more from tank A, heat losses or gains in the pressure receptacle could be compensated and constant temperature maintained within.

When a fluid drive test was to be made, valve O was

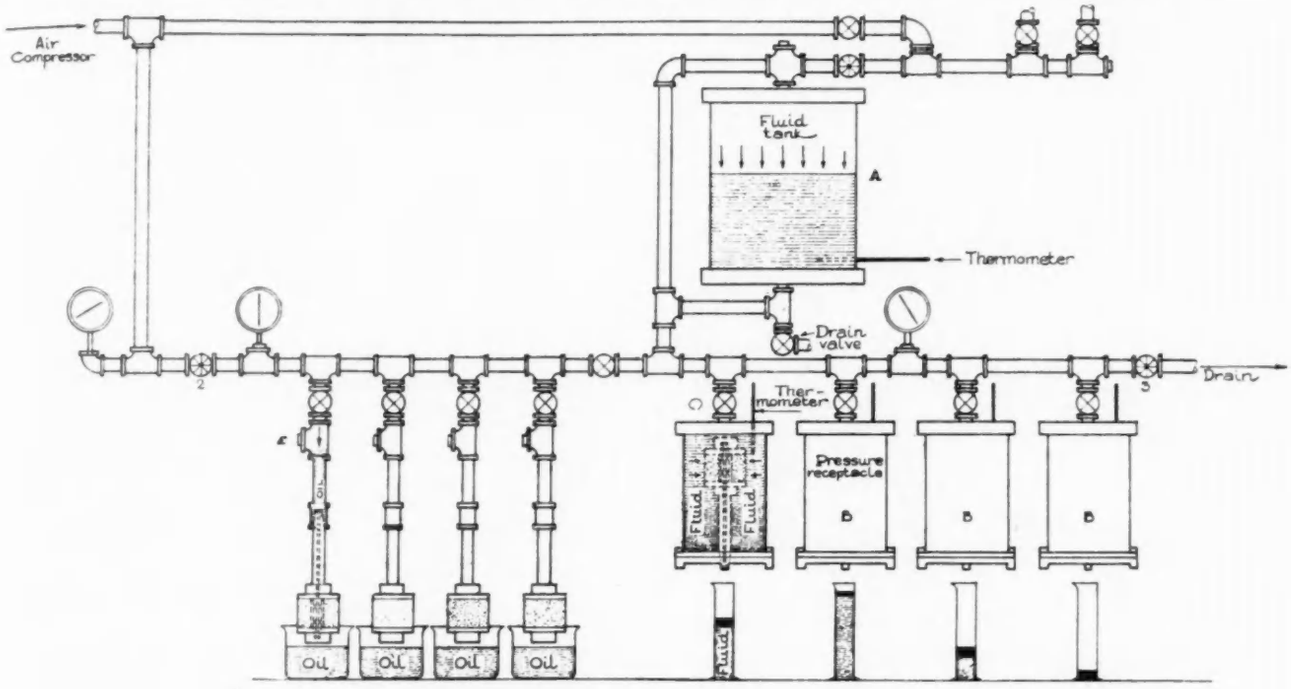

FIGURE 1—*Oil Recovery Apparatus*

completely opened, then the correct pressure maintained on the sample during the test by regulating needle valves 1 and 3.

The time interval for a test was measured from the instant the drive was started until it was stopped.

The length of time required for a pressure drive test depends on the physical properties of the sandstone, the nature of the oil, and the driving medium employed. Generally, when using a liquid drive, the samples became "watered-out" and ceased to produce oil within 30 minutes at the pressure drop used in the tests. Some samples of the Bradford sand, however, required as much as 10 hours to complete a recovery test. The oil recovered and the liquid forced through the core were collected in a graduated cylinder placed underneath the core-holder during the test, and later removed for measurement of its contents.

Oil produced by the air drive method was collected in a 10cc. graduated cylinder suspended in a suction flask sealed to the outlet of the core-holder. In this case, a wet-test meter connected to the side-outlet of the flask was used to measure the air through-put. Volumes of oil and air produced were measured and recorded at 10-minute intervals, until no more oil could be recovered from the sample.

Calculation of Results

In the tabulation of the results of these oil recovery tests the amount of oil in the sandstone sample has been termed "per cent initial oil saturation." It was found that the various samples which were tested could not be completely saturated repeatedly to exactly the same degree. A study of the pore system as revealed by photomicrographs of thin sections of the standstones leads to the opinion that many of the individual pores are connected at only one end. Furthermore, the entrances to the pores are of such sizes, and the general construction such that they can not be filled with oil by a forced drive. It was not thought advisable to reduce pressures on the samples either before or during the saturation procedure because of the probability of changing the nature of the crude oil.

Each sample was tested with various fluids. This required the removal, or extraction, of the oil and fluid remaining in the sample after a test before the sample could again be saturated with oil for the next test.

The volume of oil recovered in the graduated cylinder subtracted from the volume of oil originally in the sample equals the volume of oil unrecovered. The volume of oil left in the sample divided by the pore volume of the sample and multiplied by 100 equals the per cent of oil saturation of the pore system of the test piece after testing, and in the tabulation has been termed "per cent final oil saturation." Therefore, in the tests, although there were slight variances in the initial saturation, the recoveries of oil are figured so that they may be compared on the basis of per cent of final saturation. It was found that this could be done if the initial saturation was not below 50 per cent. Test runs having a higher percentage final saturation mean a lower recovery of oil, and those with a lower percentage final saturation mean a higher recovery of oil. A test showing zero final saturation would mean the complete recovery of oil from the sandstone. The following example is illustrative of the calculation:

Sample No. 16 Second Venango Sand, Oil City, Pennsylvania.

Porosity: 17.6 per cent.

Displacement volume: 102 cc.

Pore volume: 18.0 cc.

Oil used:

Crude from Second Venango sand, Oil City, Penna.
Specific gravity 0.844 at 70°F., 35.5°A. P. I. (60°/60°F.)

Volume of oil in sample after saturating: 16.0 cc.

Volume of oil recovered (Water drive, 65F., 50 lb./sq. in., 30 min.) 4.4 cc.

Per cent final oil saturation:

$$\frac{16.0-4.4}{18.0} \times 100 = 65 \text{ per cent}$$

Duplicate check runs were made before starting the rou-

TABLE 1

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Core Number	Porosity In %	Mls. of Void Space and Original Dry Weight	Pressure Drop Through Sample = 50 Pounds per Square Inch Time Interval for Test=10 Hours Top Figure=% Initial Sat. Middle Figure=% Final Sat. Bottom Figure=Ml. Water Through-put.		
			65°F.	100°F.	130°F.
10	10.1	16.5 389.3 g	64.0 40.0 8	65.1 39.1 13	64.8 37.6 22
24	10.14	12.07 278.7 g.	77.9 43.9 34	80.8 42.7 37	78.7 41.4 40
25	10.2	12.0 276.8 g.	76.2 44.6 49	79.1 43.3 55	80.0 42.5 59
34	11.39	12.9 263.0 g.	77.4 40.3 88	79.0 39.6 94	80.9 39.2 98
11	12.3	20.2 376.6 g.	82.2 46.0 33	81.2 44.5 37	80.2 43.1 43
35	12.44	14.0 257.1 g.	84.6 41.8 71	87.1 41.5 90	85.2 41.1 102
21	13.0	14.6 268.3 g.	63.1 35.7 23	63.8 35.1 25	64.6 34.5 31
31	13.5	15.8 262.4 g.	68.6 49.6 355	68.0 47.1 371	67.1 43.7 383
20	15.1	17.6 279.7 g.	71.5 39.2 53	70.2 38.9 61	70.9 37.5 68
23	15.93	18.17 253.1 g.	70.4 50.1 39	69.1 49.3 43	69.6 48.7 50

tine testing of the various sandstones used in the experiments. A series of tests on a sample were as follows:

Sample No. 14 Second Venango Sand, Oil City, Pennsylvania.

Porosity: 10.1 per cent.

Displacement: 100 c.c.

Pore Volume: 10.1 c.c.

Oil used:

Crude from Second Venango sand, Oil City, Penna.

Specific gravity 0.844 at 70°F. 35.5° A.P.I (60°/60°F.)

Water Drive at 50 lb./sq. in., 70°F., 30 Minutes

Run Number	Per Cent Oil Recovery
1 (a)	37.4
2 (b)	35.2
3 (c)	38.4
4 (d)	38.4
5 (e)	38.4
6 (f)	38.4

(a) Sample extracted with carbon tetracholoride to remove remaining oil, re-saturated with same kind of oil, and re-run.
(b) Sample re-prepared as above and re-run.
(c) Sample inverted in core-holder, re-run as above.
(d) Re-run as above.
(e) Re-saturated after cleaning with acetic acid and alcohol.

Forced Liquid Drive on Average Samples of the Bradford Sand

Ten samples representative of the varying physical characteristics of the Bradford sand were cut from diamond drill cores and prepared for testing. The cores were taken from various wells located in the region in McKean County, Pennsylvania, where water-flooding is employed. The samples ranged in porosity from 10.1 per cent to 15.93 per cent. The oil used was fresh crude from the same sand, having a specific gravity of 0.801 at 70°F., or 44.1° A.P.I. (60/60°F.) All weighing and measuring were done at the same temperature.

A recovery test was made on each sample, using the following liquids:

Water (65,100 and 130°F.)

2 per cent sodium carbonate solution.

1 per cent soap solution.

1 per cent soap—1 per cent sodium carbonate solution.

The concentrations of the solutions are given in percentage by weight.

The results of the water drive tests at the various temperatures are shown in Table 1. The results of the solution drive tests are shown in Table 1A.

TABLE 1A

Forced Liquid Drive Tests on Bradford Sand Samples

Core Number	Porosity In percent	Pressure Drop Through Sample= 50 Pounds per Square Inch Time Interval for Test=10 Hours Top Figure=% Initial Oil Saturation Middle Figure=% Final Oil Saturation Bottom Figure=Ml. Liquid Through-put Test Temperature=77°F.		
		2% Sodium Carbonate	1% Sodium Oleate	1% Sodium Carbonate 1% Sodium Oleate
10	10.1	64.4 40.9 12	65.4 39.4 10	66.1 38.2 20
24	10.14	76.6 43.6 27	79.5 43.1 24	80.3 42.2 39
25	10.2	78.3 44.2 38	77.1 44.6 33	76.2 42.9 57
34	11.39	79.0 41.1 50	78.2 40.3 59	80.2 38.5 57
11	12.3	80.7 45.5 22	80.7 44.1 25	81.7 43.6 34
35	12.44	85.3 41.8 44	86.4 42.2 50	83.5 40.7 90
21	13.0	63.0 36.3 22	65.3 36.0 24	63.9 35.5 27
31	13.5	68.9 49.4 210	69.5 50.0 173	68.0 47.7 200
20	15.1	72.0 39.8 67	71.4 39.2 63	72.6 36.4 52
23	15.93	71.0 48.4 25	68.5 49.3 30	69.6 44.3 24

Forced Liquid Drive Tests on Average Samples of the Second Venango

Eight samples representative of the varying physical characteristics of the Second Venango sand, taken from diamond drill cores of the sand of wells in the vicinity of Oil City, Pennsylvania, were likewise cut and prepared for testing. The samples ranged in porosity from 10.1 per cent to 20.2 per cent. The oil used was fresh crude from the same sand, having a specific gravity of 0.8441 at 70°F or 35.5° A.P.I. (60/60°F.). A recovery test was made on each sample, using the same liquid driving agents as were used in the liquid drive tests on the samples of the Bradford sand. The data concerning the water drive tests are presented in Table 2, and the data for the solution drive tests in Table 2A.

Water Drive Tests

A comparison of the data listed shows that by the water-drive there was a higher recovery of oil from the Bradford sand samples than there was from the Second Venango sand samples. It will be noted that the samples of Bradford sand were lower in porosity, and by comparison of the water throughput for the same time interval, had much lower coefficients of permeability. However, it is difficult, from the data obtained in the tests, to attribute the differences in recovery to any particular property or group of properties because of the complexity of the texture and constituents of this type of sandstone. The Bradford sand is composed of relatively fine, uniform grains, cemented mostly by secondary silica and micaceous material. It has a very dirty, dark gray appearance under the microscope. The Second Venango sand is coarser, less uniform, and is cemented by carbonate, silica, and some micaceous material. The factors of average cross-sectional area of the pores, the type of pore system, permeability, and porosity, seem to be the important physical variances in the two sands. A large difference was found in the viscosity of the two crudes at test temperatures, and in their viscosity-temperature coefficients, as shown in Figure 2.

For the Bradford samples, under the conditions of test which were described, the oil recovery averages between 40 per cent and 45 per cent of the contained oil, although some of the tests fall above or below this range. The samples of the Second Venango sand show an oil recovery of between 30 per cent and 35 per cent of the contained oil for the same type of drive, although a few tests showed a lower percentage. As a rule it was possible to put more water through the samples of the Second Venango sand in a 30-minute oil recovery test than through the Bradford sand samples in a 10-hour test, using the same pressure drop in each case.

The Second Venango sand samples are believed to be representative of much of that productive horizon. A careful examination of the data obtained in these tests and from field experience would indicate that such sands could not

TABLE 2

Forced Water Drive Tests on Second Venango Sand Samples from Oil City, Pennsylvania

Core Number	Porosity In %	c. c.s of Void Space and Original Dry Weight	Pressure Drop Through Sample = 50 Pounds per Square Inch; Time Interval for Test=30 Minutes; Top Figure=% Initial Sat. Middle Figure=% Final Sat. Bottom Figure=Ml. Water Throughput.		
			65°F.	100°F.	130°F.
14	10.1	10.1 243.0 g.	90.0 55.5 467	67.1 49.5 540	68.1 35.2 550
15	10.4	10.8 243.0 g.	84.5 56.0 6	72.2 46.5 25	62.6 26.4 21
17	12.0	13.2 238.7 g.	77.1 51.3 100	79.1 45.0 124	76.5 34.8 153
33	14.0	15.9 259.5 g.	74.5 49.3 670	80.4 44.0 714	77.3 34.6 694
18	14.5	15.95 242.4 g.	80.8 52.7 293	90.5 49.2 310	87.4 40.4 304
19	14.9	16.4 234.8 g.	85.2 54.9 340	88.9 50.0 373	90.5 42.4 363
16	17.6	18.0 228.7 g.	89.5 65.0 841	88.7 60.0 1214	88.7 45.0 1260
32	20.2	23.0 246.9 g.	77.7 58.2 285	85.1 54.3 310	75.0 43.0 296

TABLE 2A

Forced Liquid Drive Tests on Second Vanango Sand Samples from Oil City, Pennsylvania

Core Number	Porosity In percent	Pressure Drop Through Sample= 50 Pounds per Square Inch; Time Interval for Test=30 Minutes; Top Figure=% Initial Oil Saturation Middle Figure=% Final Oil Saturation Bottom Figure=Ml. Liquid Through-put; Test Temperature=77°F.		
		2% Sodium Carbonate	1% Sodium Oleate	1% Sodium Carbonate 1% Sodium Oleate
14	10.1	88.1 50.5 448	91.5 51.5 448	61.0 39.6 174
15	10.4	90.0 51.0 13	84.5 52.0 7	59.2 31.3 101
17	12.0	80.5 49.2 107	81.1 47.8 126	76.8 34.5 148
33	14.0	81.1 48.4 591	85.6 49.0 617	80.4 37.1 682
18	14.5	70.0 50.3 200	73.9 50.1 463	67.8 25.8 640
19	14.9	83.0 52.4 237	80.4 52.3 490	64.6 26.8 703
16	17.6	98.3 55.5 1036	88.3 49.3 740	99.6 23.4 860
32	20.2	81.0 56.0 240	85.6 55.2 230	79.3 42.0 296

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11	12.3	20.2 376.6 g.	82.2 46.0 33	81.2 44.5 37	80.2 43.1 43
35	12.44	14.0 257.1 g.	84.6 41.8 71	87.1 41.5 90	85.2 41.1 102
21	13.0	14.6 268.3 g.	63.1 35.7 23	63.8 35.1 25	64.6 34.5 31
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Oil used:

Crude from Second Venango sand, Oil City, Penna.

Specific gravity 0.844 at 70°F. 35.5° A.P.I (60°/60°F.)

Water Drive at 50 lb./sq. in., 70°F., 30 Minutes

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35	12.44	85.3 41.8 44	86.4 42.2 50	83.5 40.7 90
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TABLE 2

Forced Water Drive Tests on Second Venango Sand Samples from Oil City, Pennsylvania

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17	12.0	13.2 238.7 g.	77.1 51.3 100	79.1 45.0 124	76.5 34.8 153
33	14.0	15.9 259.5 g.	74.5 49.3 670	80.4 44.0 714	77.3 34.6 694
18	14.5	15.95 242.4 g.	80.8 52.7 293	90.5 49.2 310	87.4 40.4 304
19	14.9	16.4 234.8 g.	85.2 54.9 340	88.9 50.0 373	90.5 42.4 363
16	17.6	18.0 228.7 g.	89.5 65.0 841	88.7 60.0 1214	88.7 45.0 1260
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TABLE 2A

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Core Number	Porosity In percent	Pressure Drop Through Sample= 50 Pounds per Square Inch Time Interval for Test=30 Minutes Top Figure=% Initial Oil Saturation Middle Figure=% Final Oil Saturation Bottom Figure=Ml. Liquid Through-put Test Temperature=77°F.		
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15	10.4	90.0 51.0 13	84.5 52.0 7	59.2 31.3 101
17	12.0	80.5 49.2 107	81.1 47.8 126	76.8 34.5 148
33	14.0	81.1 48.4 591	85.6 49.0 617	80.4 37.1 682
18	14.5	70.0 50.3 200	73.9 50.1 463	67.8 25.8 640
19	14.9	83.0 52.4 237	80.4 52.3 490	64.6 26.8 703
16	17.6	98.3 55.5 1036	88.3 49.3 740	99.6 23.4 860
32	20.2	81.0 56.0 240	85.6 55.2 230	79.3 42.0 296

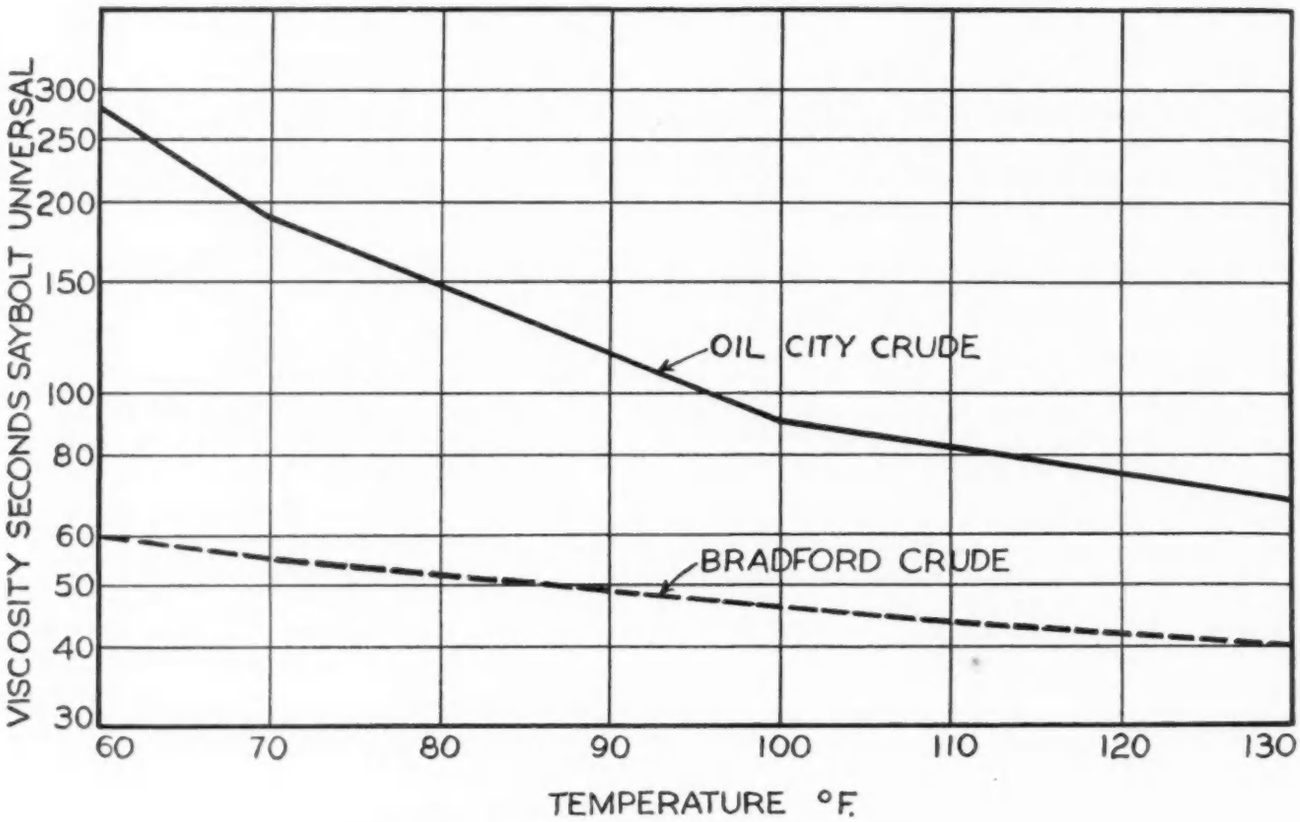


FIGURE 2—*Viscosity-Temperature Relationships*

be water-flooded profitably by present day methods. The repressuring operations and the few experimental tests of water-flooding of this sand in the field that have been carried on, and the results of core analyses, indicate that large variances in permeability in both horizontal and vertical sections of the sand frequently occur. Under these conditions, there would be by-passing of oil and channelling of flow in water-flooding operations that would result in permanent loss of much oil, unless mining operations were subsequently employed. Water-flooding operations would require large quantities of water per day and would water out at extremely rapid rates as a result of the relatively high permeability of this type of sand. Probably the one factor favorable to a consideration of an intensive water-flooding program would be the shallow drilling depth. It should be borne in mind also that the laboratory tests were conducted under much more favorable conditions than would be obtained in any Second Venango sand property that might be considered for ordinary water-flooding. No successful field applications of water-flooding in this sand are known.

Hot Water Drive Tests

The hot water flooding tests are of interest in showing the effect of viscosity on oil recovery. From Figure 2 it is seen that the decrease in viscosity (Saybolt Universal) of the Bradford crude used is 12 seconds for an increase in temperature from 65° to 100°F., and 18 seconds for an increase from 65° to 130°F. The additional recovery resulting from the use of hot water floods on samples of Bradford sand can be seen by a comparison of the water drive tests conducted at 65°, 100° and 130°F., listed in Table 1. Returning to Figure 2, there is a decrease in viscosity of 190 seconds corresponding to the increase in temperature from 65° to 100°F., for the Second Venango sand crude that was used, and a decrease of 212 seconds for the rise from 65° to 130°F. The data in Table 2 show the increase in recovery to be considerable for hot water flooding with this type of crude.

There may be localities where the crude petroleum has a more pronounced decrease in viscosity with increase in temperature than has been noted here.

In an earlier publication of the Mineral Industries Experiment Station[4] there was a discussion of the use of hot water for flooding purposes. A cursory examination of all the factors involved indicates that at the present time hot water flooding of the Bradford sand would be impractical because of the slight increase in recovery over cold water flooding as shown by these tests. Although hot water flooding of Second Venango sand properties containing crude whose viscosity is appreciably affected by temperature might be considered because of the increased oil recovery, the large quantity of heat required for the water necessary in flooding operations makes it uneconomical. Furthermore, the difficulties encountered in water-flooding the Second Venango sand are still present and are not lessened in importance by the use of heat.

The results of cloud and pour tests on these crudes are given in Table 3. Large differences are again seen in the character of the two crudes. There may be some instances of Bradford crude in which wax crystallization begins at higher temperature than those which have been investigated. The supplying of enough heat to the water to prevent wax crystallization in the crude near the water contact

[4]Barb and Shelley, Mineral Industries Experiment Station, Bull. 6 (1930).

may be desirable from an operating standpoint in some water-flood operations.

Table 3

Cloud and Pour Tests of Crudes Used

Crude—	Cloud Point (by 2°F.)	Pour Point (by 5°F.)
Bradford	50	5
Second Venango, Oil City, Pa.		35

Sodium Carbonate Solution Tests

There has been considerable effort to discover a more effective flooding-agent or solution than water for use in the liquid-flooding of oil sands, and sodium carbonate solution has perhaps been suggested in this connection more than any other agent. A comparison of the results obtained by the use of sodium carbonate solutions in the runs of the type described in this paper with the results obtained by other investigators[5,6,7] is of unusual interest. That the solution of sodium carbonate and water yields better results than water in recovering oil from unconsolidated systems may be due to the decrease in interfacial tension between the oil and the flooding medium, has been pointed out by Uren[8].

In reviewing previous investigations, certain water-soluble salts of strong bases and weak acids were found to be superior to water when used for oil recovery under certain conditions. A solution of sodium carbonate (one to two per cent by weight) generally seemed to be as favorable and practicable as any agents tried. These investigations were made in nearly all cases with unconsolidated sand tamped in a flow-tube arrangement. An exception was the use of rounded blocks of Dakota sandstone[9], having an average porosity of about 23 per cent, and apparently unconsolidated in comparison with the Appalachian sandstones used in the experiments described here.

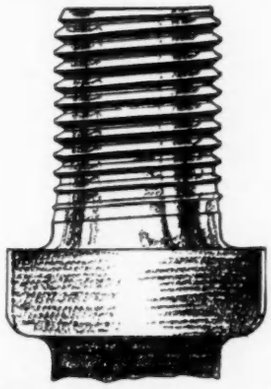
Experiments analogous to those described in the literature were performed by the author on unconsolidated sand systems and on lead shot systems, and similar results were obtained. A decrease was noted, however, in the relative effectiveness of sodium carbonate solutions over water in systems having fine pore spaces. The behavior of sodium carbonate solution in the system of very fine and minute pores found in the Bradford and Second Venango sands of Pennsylvania was strikingly different from that observed in the case of unconsolidated sands.

The results of these experiments, listed in Tables 1A and 2A, show either no or only small marginal increases in oil recovery by the use of sodium carbonate solutions. The small increase in oil recovery due to the use of sodium carbonate solution instead of water in the Second Venango sand tests may be due to the differences in temperatures at which the respective tests were made, namely 65 and 77°F. This difference does not appear in the Bradford sand tests, due probably to the lower viscosity-temperature coefficient of the Bradford crude used.

The sodium carbonate solution in these tests apparently had only a simple displacement action, similar to the action of the water drive. It seems that the sodium carbonate solution pushed the mobile, free oil contained in the pore spaces directly ahead of it but did not affect oil occurring in a film around the sand grains nor the oil trapped in non-communicating, "dead-ended" pore interstices. The action is believed to be essentially the same as that which took place in the water drive tests previously discussed.

Results of field tests with sodium carbonate solution have been equally disappointing. Occasional plugging of the sand, reaction with mineral salts dissolved in either connate

[5]Fyleman, J. Soc. Chem. Ind. (London) **21** 41 T (1922).
[6]Nuttling, Ind. Eng. Chem. **17**, 1035 (1925).
[7]Beckstrom and Van Tuyl, Bull. A. A. P. G. **11**, 228 (1927).
[8]Uren and Fahmy, Trans., A.I.M.E., Pet. Div., 1927, 318.
[9]Beckstrom and Van Tuyl. Loc. Cit.



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or flood water which causes dilution of the solution and additional expense, combined with little or no increase in oil recovery have characterized sodium carbonate drives in the field at one time or another. It has been said that sodium carbonate has not been given a fair trial in the field because the chemical had not gone across with the drive, but some sodium carbonate is known to have appeared in the oil well in the last field attempt.

Soap Solution Tests

If it be assumed that the mobile, "loose" oil contained in the pores is removed by the displacement of the approaching water-drive and oil held elsewhere is not removed, a flooding agent that would have more than a piston action is desirable. It was thought that perhaps a soap solution could be utilized to "wash" the oil sand in the flooding process, since in the case of ordinary washing operations it is generally found that the soap attacks enveloping grease or oil films and removes them.

Among theories[10] that have been brought forward to explain the detergent action of soaps in washing are (1) Emulsification, (2) Alkali, (3) Wetting, (4) Brownian movement, (5) Lubricant. A summarization of these would attribute the cleansing action of soap to its power (1) of emulsifying oily substances; (2) of wetting and penetrating into oil textures; (3) as a lubricant for the dispersed oil. Soap solution has only a low surface tension (about 40 per cent of water), its cohesion is small, its viscosity little different from pure water.

A one per cent (by weight) solution of commercial sodium soap flakes was used in the experiments. Sodium soaps are soluble in water but calcium and magnesium soaps are insoluble in water.

While an additional quantity of oil was recovered by the combined washing and displacement action, the results of the tests in general did not seem to be particularly favorable considering the additional factors involved by the use of the soap solution.

Tests also were made of two other types of commercial soaps. One was very strong, concentrated, in powder form, the other a liquid soap with pronounced detergent properties. Compared with the commercial sodium soap flakes, these two soaps had a much greater washing power in ordinary washing operations on dirty oil covered substances. This effect was not noticed in the flooding tests, due probably to the fact that such agitation as occurred in the flow was insufficient to attain much washing effect in any of the soap tests. The motion of the liquid through the samples was of the streamline type as occurs in field practice.

The amount of soap required makes the cost too high for field operations. The increased recovery as indicated by the tests does not warrant the added expense for a drive using these soaps.

Calcium and magnesium present either in the connate water or flood water in an ionized condition would form a precipitate of insoluble calcium soap, a stringy curd that would have a dangerous plugging action in the sand pores. Barb[11] has mentioned this and describes some special tests to determine it. Plugging was not a trouble in these oil recovery tests as the samples did not contain water.

The oil was recovered from these tests largely as an oil-in-water emulsion, which although not difficult to break, adds complications to the process.

Sodium Carbonate—Soap Solution Tests

Various proportions of both sodium soap and sodium carbonate were dissolved in water and the action of the mixture tested. A mixture of one per cent by weight of soap and one per cent by weight of sodium carbonate was generally used, although the amount of soap used could be decreased to 0.25 per cent —0.5 per cent without an appreciable loss in effectiveness.

The use of such solutions was encouraging in many of the tests, some in particular showing a large increase in oil recovery over that obtained from the same sample by ordinary water-flooding. The results obtained by the use of the soap-soda mixture appeared to be erratic in some respects. Unusual variances in the per cent recovery were found in tests of different samples of the same sand which cannot be explained except by small variations in the texture of the different samples. The oil was produced in an emulsion as the finely divided disperse phase.

There is some evidence that this mixture is a more efficient driving fluid than water in most of the tests, particularly with the looser, more permeable sands which have relatively large pore openings.

While the soap-soda drive seemed to be more efficient, under the test conditions, than other drives studied, several factors are opposed to a commercial utilization and these must be considered in a study of its use. The factors are the cost of the soap and sodium carbonate and the expense of applying it, the loss of soap and soda due to neutralization by calcium and magnesium salts present in the connate water or in the oil sand itself, the plugging of the pores by the precipitate formed and the formation of emulsions in the production of the crude.

In spite of the disadvantages enumerated against the utilization of this recovery agent, it possesses possibilities. Further investigation is needed to determine exactly the

[10]Martin, The Modern Soap and Detergent Industry, pp. 34-48. Crosby Lockwood and Son, London (1924).

[11]Barb, Mineral Industries Experiment Station, Bull. 48, 28 (1931).

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TABLE 4

Air Drive Tests on Samples of the Bradford and Second Venango Sands of Pennsylvania

Sample Number	Porosity % Void Space mls.	Pressure Drop lbs./sq. in.	Temp. Deg. F.	Pressure mm.	Saturation Percent		Duration of Test Minutes	Volume of Total Air Cu. Ft.	Average Air-Oil Ratio Cu.ft./bbl.
					Init.	Final			
31*	13.5 15.8	25	83	737	55.6	39.2	80	0.410	25,600
36*	14.68 17.3	25	82	734	76.6	52.3	110	0.793	30,000
20*	15.1 17.6	25	79	725	47.0	34.5	250	0.215	15,550
14†	10.1 10.1	25	77	738	72.7	42.0	110	4.303	222,000
15†	10.4 10.8	25	76	728.5	59.2	46.1	90	0.091	8,500
16†	17.6 18.0	25	78	736	64.5	42.7	140	3.594	146,500

*Bradford Sand and Bradford Crude.
†Second Venango Sand and Oil City Crude.

function of the solution and to obtain a clearer insight of the phenomena involved.

Tests With Other Liquids

The wetting power of sodium silicate on quartz and its detergent value has been described frequently.[12] Displacement of oil retained as a film around the sand grains because of preferential wetting by a solution seems to be prevented due to the inability of the solution to break through the film and allow the phenomenon to take place. A test drive using a sodium silicate (water-glass) solution produced no evidence of an increase in recovery over that of water. There is the danger of a gelatinous precipitate of calcium silicate being formed in field application of this reagent.

A mixture of a sodium soap, sodium carbonate, and sodium silicate was no more effective than a solution of soap and the carbonate.

A sodium hydroxide solution did not perform advantageously, although it does have a good wetting power. Evidently if agitation of the system by mechanical means was possible and if the enveloping oil film could be broken, more oil could be recovered due to preferential wetting by the sodium hydroxide solution. Grunder[13] reports that a sodium hydroxide solution having a hydrogen ion potential of 10 recovered virtually all the oil with the aid of severe mechanical agitation from oil sand which had been mined. He found a sodium carbonate solution had the same effect, but solutions of sodium xanthate, sodium palmitate, water, sulphuric acid and lime water had relatively little effect in the tests.

Air Drive Tests

The results of a few tests on Bradford and Second Venango samples are given in Table 4. The data show the average gas-oil ratio, in cubic feet of free air per barrel, for each test. Each test was continued until no more oil could be recovered. This procedure required larger volumes of compressed air in proportion to the oil produced than is generally used in air re-pressuring operation today, which accounts for the high average gas-oil ratio recorded.

These tests are believed to have been carried beyond the economic limit that exists today in most field applications of air-repressuring on these two sands. The data are chiefly of interest because they indicate the final oil saturation percentage which can be obtained by the air drive on these sands under the stated test conditions.

Conclusions

From the data and experience gained in running a total of over 200 pressure drive tests on samples taken from cores of the Bradford and Second Venango sands, the following conclusions are made:

(1) An average oil recovery of 40-45 per cent of the contained oil is obtained by the water drive from Bradford sand samples. The average final saturation of oil remaining in the Bradford sand samples after the water drive tests is 40 per cent.

(2) An average oil recovery of 30-35 per cent of the contained oil is obtained by the water drive from Second Venango sand samples of uniform texture. The average final oil saturation in the Second Venango sand samples after water drive tests is 55 per cent.

(3) The time interval for depletion or watering-out of the Second Venango sand by any liquid drive is considerably less than that for the Bradford sand using the same driving agent.

(4) Hot water flooding is effective if the viscosity-temperature coefficient of the crude is high, since final per cent oil saturation, or the oil-sand equilibrium, is in part a function of viscosity.

(5) Solution of sodium carbonate, sodium silicate, sodium hydroxide, are no more effective than water as recovery agents in a forced drive through tightly consolidated Pennsylvania oil sandstones. Sodium soap solutions are slightly better than water, but cost more and present difficulties in operation.

(6) Water, solutions of sodium carbonate, sodium silicate, and sodium hydroxide, when used as driving agents in consolidated Pennsylvania sandstones, displace only the mobile or free oil in the pores ahead of the drive, volume for volume, and leave the remaining oil as enveloping layers around the sand grains and in "blind-alley" pores.

(7) A mixture of sodium soap and sodium carbonate solutions is better than water as a driving agent in the more porous Second Venango sand samples of uniform texture, in that it is possible to attain by their use from 10 per cent to 20 per cent lower final saturation of oil. This solution will form a precipitate that will result in plugging the sand if ionized calcium or magnesium is present in the strata.

[12]Silicate P's & Q's, Vols. 10 and 11 (1930-31) Philadelphia Quartz Company.
[13]Werner Grunder: Chemiker und Techniker-Zeitung, **48**, 111, (1930).

Crockett County Wildcat Will Determine Campaign

San Angelo, Texas.—A single wildcat test in process of completion at the close of last week in Crockett County on a unitized block of leases will be a determining factor as to whether the West Texas district is to launch an aggressive deep drilling program amidst established producers in the regular lime horizon during 1933. This important well is the Ordovician lime test of Stanolind Oil & Gas Company and nine other participating companies on the J. S. Todd ranch, situated about 35 miles southeast of the Big Lake field, which is the only known Ordovician production source in Texas. Todd 1 was drilling out cement plug late last week after cementing seven-inch pipe with 500 sacks on top of Ordovician series at 7006 feet, preparatory to the testing of oil and gas saturated lime pays between 7189 feet and the present depth of 7357 feet.

A successful completion in the Ordovician lime in Crockett County would be the starting signal for the drilling of a number of deep tests over the district on structures considered favorable, especially where short time leases are involved. An added inducement for going after Ordovician production is that oil produced from the lower section (based on experiences attained from 12 deep wells drilled in the Big Lake field) yields a lube oil content that ranks in quality and quantity with some of the best grades obtainable from Pennsylvania grade of oils.

Emptying of lease storage tanks of L. C. Harrison et al's Addis 1, a recent wildcat strike in Ector County, permitted the well to be restored to production early last week. It was deepened from 3927 to 3933 feet without any appreciable increase in oil and gas flow. The well was averaging 14 barrels of 34.3 gravity oil hourly at the latter depth. The oil is loaded aboard tank cars and delivered to the Big Spring plant of Howard County Refining Company, which is now under the management of V. E. Jackson and associates. Stanolind Oil & Gas Company has authorized the drilling of a north offset to Addis 1.

Sid Richardson, Forth Worth operator, is the most active independent in the West Texas district in fulfilling a continuous development program assumed last summer in acquiring a large block of leases on the W. F. Scarborough ranch, centering on the Llano pool, Winkler County. Richardson et al's Scarborough-Skelly 1, SWc NE NW Section 1, Block 77, P. S. L. survey, was completed last week flowing 80 barrels of 38° gravity oil daily from sandy-lime at 2840-3005 feet. Scarborough-Pure 1-A, west offset, is flowing 150 barrels daily while drilling below 2925 feet. Scarborough-Tidal 1, located a short distance to the southwest, increased its gas flow to 12,000,000 cubic feet daily while drilling by tools at 2630 feet, but the gas has since decreased about one fourth in volume. The hole has been deepened to 2650 feet, with the tools apparently sidetracked. Richardson et al's Scarborough 1-B, located in adjoining section to the west, is drilling below 1000 feet.

Commission Continues Hearing on East Texas Proration to January 12
(*Continued from page* 8)

greatest of any in all the world, and it places a solemn obligation on this commission and the operators and the people of Texas to try to solve it with fairness, temperance, and the deepest patriotism.

"In our opinion this is the most important hearing to the people of Texas ever held by the railroad commission. There is so much involved in the issue with such far reaching results, that we all should approach this hearing with the full realization of the gravity of the situation and use every endeavor to solve the difficult problems for the good of all.

Hits Injunctions

"We know of no calamity that could befall our state more disastrous than the failure by our courts to enforce our orders of proration and to destroy them by the route of injunction or by restraining writs without the opportunity of a fair and public hearing, either by our state courts or federal is in no way conducive to good government. It is unfair, unwise, non-democratic, and was never intended by those great patriots who so wisely founded our government and established our judiciary in both state and nation.

"All men should see the great danger ahead, and in a spirit of patriotism and fairness join this commission and help prepare, promote, and enforce an order that will truly conserve this, our greatest natural resource, for the benefit of not only our people but also those who may come after us."

A most drastic change in the method of prorating the state was suggested by commissioner Thompson during the hearing. He would set a flat top per-well allowable for every oil field in Texas, permitting no well to produce more than this amount, and prorating downward from this top. The object of this plan would be to more fairly allocate the production of all wells, and obviously met with the approval of the East Texas group.

The interrogation of the witnesses purchasing in East Texas centered largely on the question as to whether or not they would take additional connections in East Texas. The attitude of most of the buyers appeared to be that they were willing to accept these connections if they had some assurance through orders of the commission that such action would not incite a drilling campaign that would create another similar situation 60 or 90 days hence.

Tidal Oil Company Moving Texas Office to Houston

Houston, Texas.—District offices of the Tidal Oil Company now located at Fort Worth will be transferred to Houston early this week in line with the policy of a number of leading companies recently in locating here so as to make the most of production opportunities offered by the Coastal dome belt, and the so-called Conroe trend across the lower section of the state. Jas. R. Gahan, vice president in charge of the Fort Worth office for nearly 10 years, will continue in the same capacity when the Fort Worth organization is brought here intact to be augmented by a skeleton land and geological force located by the company here a few months ago as a preliminary to its entrance into the Conroe field. Office space has been taken in the Esperson building.

Department heads to be included in the personnel of the Houston office includes: J. C. Wilhoit, head of legal department; W. F. Bowman, district geologist; N. W. Boston and W. B. Royer, land department; Mr. Farrero, paleontologist; Harry Leyendecker, chief scout; Mark Hopkins, manager engineering department.

Tidal Refining Company, crude purchasing and pipe line subsidiary, will also locate here, with Geo. W. Goad, manager.

Tidal Oil Company will be represented at Fort Worth by K. A. Schmidt, district geologist for West and East Texas.

D. E. Legan, production superintendent for the company in the East Texas and Conroe fields, will continue to divide his time between the two areas. Frank Schneider, Midland, is superintendent in charge of West Texas and New Mexico properties.

MARKETS ~ STATISTICS

With East Texas Still Closed In, Other Districts Add Declines to Bring United States Production to Lowest Point Attained in Years.

Production Drops Further With East Texas Shut Down

UNITED STATES crude oil production dropped during the week ending December 31 to the lowest daily average recorded in approximately a decade, falling even below the low points of the previous week and of August-September, 1931, when the East Texas field was first shut down through martial law. The low level of the week of December 31 was set in consequence of continued shut-down of the big East Texas field, inaugurated December 17 by the Texas Railroad Commission, plus important declines of production in other sections of Texas and in Oklahoma, Kansas, and California.

The record low mark was set at 1,697,155 barrels daily for the whole United States, a decline of 76,135 barrels from the level of the previous week.

Since the commission's order to shut in the East Texas field was not made effective until noon of December 17, a slight amount of production, from seven o'clock of that morning until noon, was included in the production figures of the week ending December 24. For the week of December 31, on the other hand, there is no record of any production in that big field. The commission's shut-down order was scheduled to apply until the morning of January 1.

Added to the above noted wiping out of East Texas production there were during the week ended December 31 minor declines in output of the Texas Panhandle and South Texas and a 13,000-barrel drop in the Texas Gulf Coast fields, so that Texas as a whole experienced a drop of about 30,000 barrels in average daily production, falling to 507,340 barrels daily.

Oklahoma Makes Big Drop

An even greater drop was recorded in Oklahoma, which declined over 40,000 barrels to 356,840 barrels daily under the influence of a 32,000-barrel reduction at Oklahoma City and an 8000-barrel slump in the Seminole area. While Oklahoma shows large fluctuations of this nature from week to week as common practice, particularly as regards Oklahoma City, the mentioned drops were larger than the customary upward or downward fluctuations, carrying the state total to an exceptionally low level even as compared with previous low marks.

While Kansas declined about 3000 barrels to 89,825 barrels daily, the largest fluctuation among individual fields was at Voshell, which declined more than 2000 barrels.

California receded 3000 barrels to a daily average output of 470,000 barrels for the week of December 31. Among the more conspicuous fluctuations from the standpoint of individual fields was a 2000-barrel decline at Santa Fe Springs, which dropped to 55,000 barrels daily.

THE OIL WEEKLY
Estimated Average Daily Production in Barrels

District: TEXAS—	Week Ending Dec. 31	Dec. 24
Texas Panhandle	44,150	47,690
North and West Central Texas	73,075	73,175
West Texas	160,100	160,100
East Central Texas	49,500	50,000
East Texas Field	*	12,000
South Texas	53,785	54,375
Total Texas Outside Gulf Coast	380,610	397,340
Texas Gulf Coast	126,730	139,500
Total Texas	507,340	536,840
OKLAHOMA—		
Oklahoma City	61,550	93,050
Seminole Area	119,440	127,845
Other Oklahoma	175,850	176,515
Total Oklahoma	356,840	397,410
KANSAS—		
Ritz-Decker	14,390	13,590
Voshell	5,910	8,210
Other Kansas	69,525	70,940
Total Kansas	89,825	92,740
LOUISIANA—		
North Louisiana	28,750	28,800
Louisiana Gulf Coast	35,100	35,200
Total Louisiana	63,850	64,000
ARKANSAS	32,500	31,500
CALIFORNIA—		
Long Beach	69,000	69,000
Santa Fe Springs	55,000	57,000
Midway Sunset	47,500	48,500
Kettleman Hills	59,300	58,500
Other California	239,200	240,000
Total California	470,000	473,000
MOUNTAIN STATES—		
Wyoming	32,300	31,750
Montana	5,450	5,450
Colorado	2,500	2,500
New Mexico	27,850	27,600
Total Rocky Mountain States	68,100	67,300
EASTERN STATES	91,450	92,700
MICHIGAN	17,250	17,800
Total United States	1,697,155	1,773,290

*Field shut-in under orders of railroad commission.

Small Hope California Will Attain Proration Quota

STATE production has not approached the correct total of 440,000 barrels, and there is doubt whether the allowable will be reached under the present setup. The excess of 30,000 barrels daily, or more, is being absorbed one way or another, but it is known that the major purchasing companies are tired of the burden. If the Mid-Continent situation becomes worse, lower crude prices are possible on the West Coast.

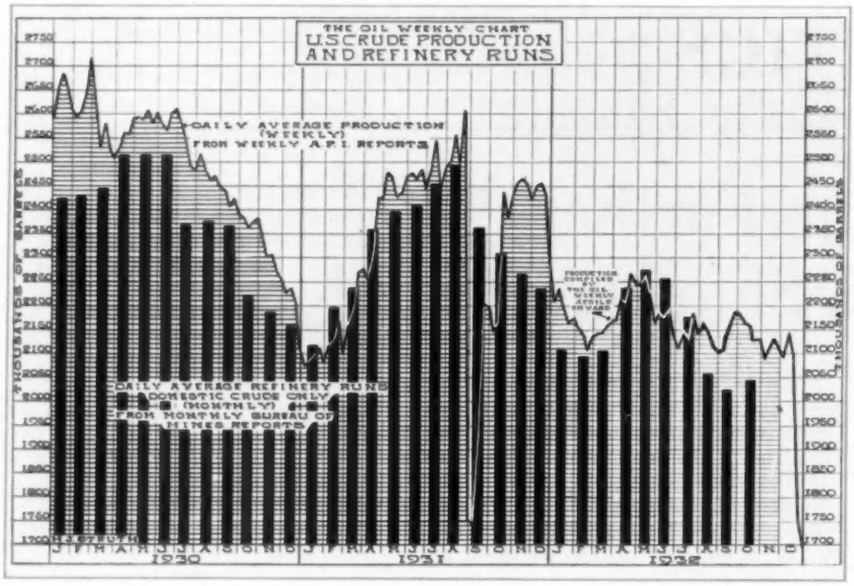
A steadier gasoline price structure during the past year has influenced integrated companies to maintain a higher crude price schedule than was justified during period of overproduction, but it was realized that a radical reduction in crude prices would lead to lower gasoline quotations.

Third Grade Gasoline

The third grade gasoline handled all through the year by major marketing companies held price cutters in check, since the price of the third grade product was placed very low for a time. When it was obvious that the larger companies meant to meet competition at any price, a higher price structure was maintained by the small price cutters. Gasoline and crude prices are very closely related on the West Coast, as the small refiners determine the retail price of their gasoline by the price paid for crude oil.

Failure of a few fields to meet their allowables is still viewed with alarm. The excess is small, but it is enough to cause a radical adjustment if demands for California products drop further. The large companies are backing away from a few thousand barrels daily, and it is known that they have their hands full in trying to protect their own interests.

It is feared that a flood of oil from



the Mid-Continent would result in at least nominal shipments of gasoline to California. Three cargoes have been shipped to the Pacific Northwest, and even this small amount has been enough to affect shipments to a territory formerly completely dominated by California.

An effort to trade California gasoline for East Texas crude or gasoline has been made, but little progress has been made along this line. In this way California crude would satisfy the anti-knock demands of the Atlantic Seaboard, while East Texas would help to satisfy the third grade California demand.

Inventory Period Prolongs Slow Gasoline Buying

IN addition to the adverse conditions which the Mid-Continent market faced during the week ending December 24, there was during the past week a tendency of jobbers to further reduce their almost minimum stocks for inventory and tax purposes. As a result buying was slightly slower and prices remained at approximately the same levels. Again the anticipated effect of the East Texas shut-down failed to materialize in the refinery gasoline market. While many of the smaller refineries in that district are said to have been shut down or greatly curtailed, the larger plants apparently were able to secure a sufficient crude supply and runs to stills were not materially reduced. It is also understood that many refiners had contracts based on old crude price schedules and, being anxious to make delivery before the end of the year, were in fact making an effort to boost runs.

Natural gasoline remained scarce on the open market but buying had taken a material slump especially from major refiners who have been buying this product for transportation into the Great Lakes region through Great Lakes Pipe Line Company's system. Ruling prices based on Group 3, Oklahoma, exclusive of federal tax appeared to be as follows:

Refinery Gasolines: Low octane, U. S. Motor, 2¾ to 3 cents; middle octane, 3 to 3¼ cents; high octane, 3½ to 3¾ cents; 60-62, 400 e.p., 3 to 3¼ cents; 64-66, 390 e.p., 3¼ to 3½ cents; 64-66, 375 e.p., 3⅜ to 3⅝ cents; and 68-70, 360 e.p., 3½ to 3¾ cents.

Natural Gasoline: Low gravity, stabilized, 12 to 14 pound vapor, 3¼ to 3½ cents; 16 to 18 pound vapor, 3 to 3¼ cents; 18 to 22 pound vapor, 2¾ to 3 cents; and 26-70, 2½ to 2¾ cents.

Kerosenes: 41-43 gravity, 3⅜ to 3½ cents; 42-44 gravity, 3½ to 3⅝ cents; and 44-46 gravity, 3¾ to 4 cents.

Week's Imports Fall Below Four Week Average

IMPORTS of crude and refined oils at principal United States ports for the week ended December 24 totaled 642,000 barrels, a daily average of 91,714 barrels, as compared with a daily average of 127,286 barrels the previous week and 114,036 barrels daily for he four weeks ended December 24. These figures were furnished by the American Petroleum Institute.

For the week of December 24 receipts of California oil at Atlantic and Gulf Coast ports, including crude and refined oils, amounted to 234,000 barrels, a daily average of 33,429 barrels, compared with an average of 31,714 barrels the previous week and 40,000 barrels daily for the four weeks ended December 24.

Humble Offers Market for Customers Oil in Storage

Houston, Texas.—An offer to buy in and settle on today's posted price of 75 cents per barrel, less accumulated storage charges, 20 per cent of the storage oil held by producers in the East Texas oil field in the facilities of Humble Pipe Line Company was made by Humble Oil & Refining Company December 29. The latter has been withholding payment on 40 per cent of the gross volume of oil accepted from outside connections in the field since 7a.m., September 16, with the unwanted oil going to storage in Humble Pipe Line Company's system at the expense of the owner. Between September 12 and 16 only 50 per cent of the outside oil was paid for and the remainder was diverted to storage. It is believed that about 750,000 barrels of East Texas crude belonging to other producers had been impounded under the above arrangement until the closing in of the field December 17.

Although Humble Oil & Refining Company has agreed to absorb the assessed pipe line gathering charge of 10 cents per barrel against every barrel taken for storage, it has announced that the producers must pay Humble Pipe Line Company three cents per barrel monthly rental. Crude that has been impounded 90 days would be charged with nine cents storage, making the settlement price only 66 cents per barrel, with usual pipe line deductions.

East Texas producers caught by this part payment and storage arrangement of Humble Oil & Refining Company missed sharing in the $1.10 posted price used by the majority of the major purchasers between October 15 and December 15, as the above concern adhered to the 98-cent posting throughout, even though it was settling for only a portion of the outside oil accepted.

No action has been taken toward buying in the storage oil accumulated under the same arrangement in Panhandle, North and portion of West Central Texas districts.

The Lamp Shows October Statistics as Paradox

UNDER the heading "The October Paradox," The Lamp, publication of Standard Oil Company of New Jersey, reviews oil statistics for October, 1932, as shown in the accompanying table. The paradox pointed out is that while production of gasoline for the month was up and consumption more substantially off, still there was a draft on gasoline stocks.

"The total output of motor fuel," says the review, "increased during the month of October by some 37,000 barrels per day. Daily average consumption of motor fuel, including exports, fell off 96,000 barrels. The result, obviously, should have been an addition to stocks—something which the industry has come to expect during the fall months following the heavy consumption of the summer season. But stocks of motor fuel do not show an increase. On the contrary, they are down nearly a million barrels.

"The joker in this seemingly contradictory situation lies in a comparison between consumption and gasoline output. For some months the production of motor fuel, including imports, has been running below total consumption so that we have had a more or less continuous and much to be desired draft upon storage. In September, stocks of motor fuel showed a falling off of more than 5,000,000 barrels from the previous month. Now in October, gasoline output likewise ran below demand, but the draft on storage amounted to less than 1,000,000 barrels compared with more than 5,000,000 the month before. So the industry drew from its tanks approximately 4,000,000 barrels less than it did in September.

"As expected, consumption showed its usual seasonal decline. The disappointing feature lies in comparing the October demand with that of a year ago, which reveals a falling off of nearly 16 per cent (if we include exports) over 1931.

Expect Line Breaks When East Texas Starts Again

Fort Worth, Texas.—Suspension of all production in the East Texas oil field since the issuance of the shut in order effective noon December 17 by the Texas Railroad Commission has not reacted favorably to the wholesale prices on gasoline in East Texas and North Texas. There were abundant supplies of U. S. motor gasoline offered by independent refiners in the above two important manufacturing centers late last week at a price range of 2½ to 2¾ cents per gallon, with the lower price predominating on most spot sales. General knowledge that the closing down of the field was to be a temporary proposition, probably not extending far into the new year, dispelled any fear among jobbers as to their ability to cover on requirements at virtually buyers' prices.

A federal court injunction issued here December 23 authorized East Texas refiners to buy and transport stored oil from any parts of the field to their plants, thus removing a threat of a possible crude shortage for many of the plants. Having been over ruled by this court order, the commission announced on December 28 that it would grant the same privilege to all pipe lines serving the field upon presentation of proof that the oil had been produced prior to the shutdown order. Sufficient crude existed above ground in the field to fill the requirements of all parties for a week, or more.

Michigan Crude Given Ten Cent Price Increase

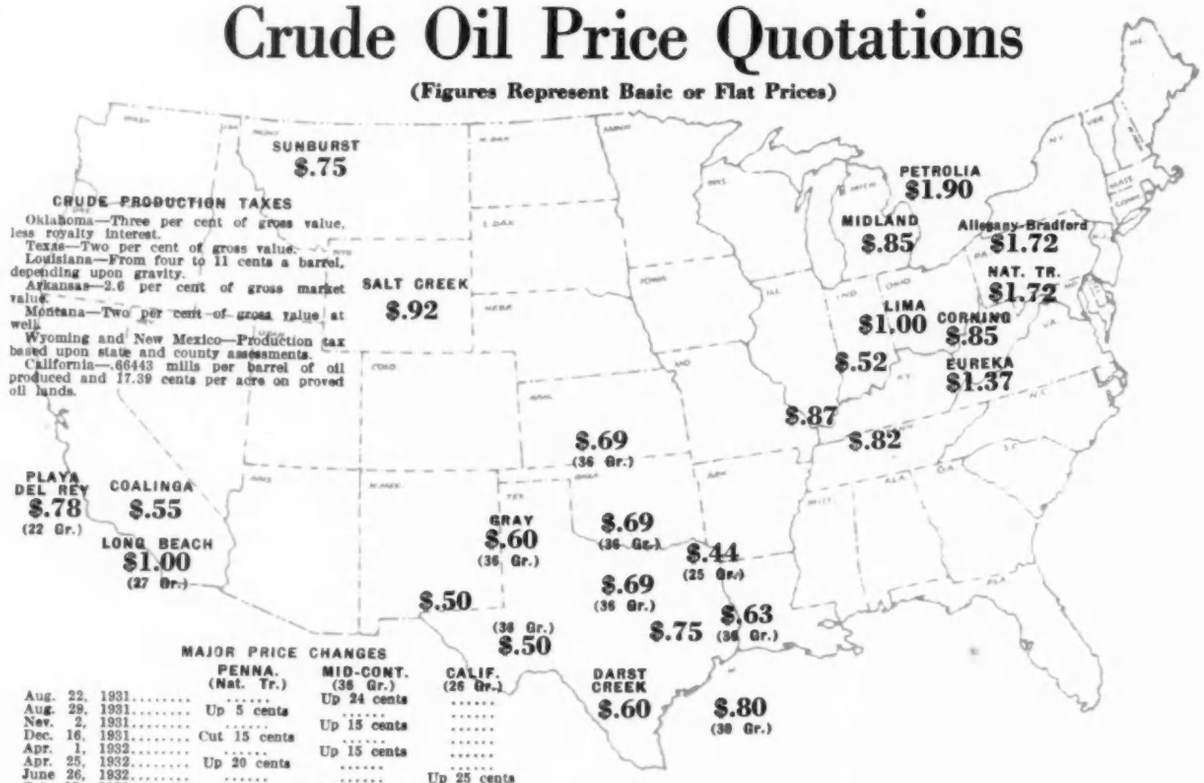
Mt. Pleasant, Michigan, Dec. 30.—Effective December 31, the Pure Oil Pipe Line Company, buyer of the bulk of central Michigan crude, today announced a price increase from 85 cents to 95 cents per barrel. The Simrall Pipe Line Company and Peerless Pipe Line Companies posted similar advances.

	1932		Increase or Decrease	October 1931	October 1932 Inc. or Dec. from October 1931
	October	September			
Daily Average U. S. Crude Production	2,104,000	2,168,000	**—64,000**	2,364,000	**—260,000**
" " U. S. Imports of Crude	79,000	63,000	16,000	132,000	**—53,000**
" " U. S. Crude Supply	2,183,000	2,231,000	**—48,000**	2,496,000	**—313,000**
Average Price 36° Mid-Continent Crude	$ .92—1.04	$ .92	.....	$ .62	.....
Oil Producers Completed	825	913	**—88**	705	120
Wells Drilling Last of Month	2,364	2,415	**—51**	2,316	48
Daily Average, U. S. Imports of Products	45,000	41,000	4,000	127,000	**—82,000**
Daily Avg., Domestic Consumption Crude & Products	2,510,000	2,627,000	**—117,000**	2,941,000	**—431,000**
" " Exports Crude and Products	259,000	261,000	**—2,000**	337,000	**—78,000**
" " Total Consumption Crude and Products	2,769,000	2,888,000	**—119,000**	3,278,000	**—509,000**
Total Stocks of Crude and Products	607,407,000	613,142,000	**—5,735,000**	628,159,000	**—20,752,000**
Daily Average, Crude Run to Stills	2,152,000	2,130,000	22,000	2,454,000	**—302,000**
" " Motor Fuel Production	1,083,000	1,046,000	37,000	1,246,000	**—163,000**
" " Domestic Motor Fuel Consumption	1,040,000	1,122,000	**—82,000**	1,140,000	**—100,000**
" " Exports of Motor Fuel	77,000	91,000	**—14,000**	112,000	**—35,000**
" " Total Motor Fuel Consumption	1,117,000	1,213,000	**—96,000**	1,252,000	**—135,000**
Total Stocks of Motor Fuel	50,497,000	51,435,000	**—938,000**	51,972,000	**—1,475,000**
Price of U. S. Motor Gasoline, F. O. B., Group 3	3.97¢	3.88¢	.09¢	3.55¢	.42¢
Average Tank Wagon Price Gasoline, 50 Cities, ex-tax, First of Month	11.47¢	12.81¢	**—1.34¢**	11.43¢	.04¢
Average Gasoline Tax	5.14¢	5.14¢	.....	*4.09¢	1.05¢
Daily Avg., Domestic Consumption Gas and Fuel Oil	781,000	756,000	25,000	945,000	**—164,000**
" " Exports Gas and Fuel Oil	48,000	43,000	5,000	74,000	**—26,000**
" " Total Consumption Gas and Fuel Oil	829,000	799,000	30,000	1,019,000	**—190,000**
Average Price, Bunker C Fuel Oil, Ex. Term., N.Y.H.	$ .75	$ .79	**—$ .04**	$ .67	$ .08

*Federal Tax of 1 cent not in effect.

Crude Oil Price Quotations

(Figures Represent Basic or Flat Prices)



MAJOR PRICE CHANGES

	PENNA. (Nat. Tr.)	MID-CONT. (36 Gr.)	CALIF. (26 Gr.)
Aug. 22, 1931	.....	Up 24 cents	.....
Aug. 29, 1931	Up 5 cents	.....	.....
Nov. 2, 1931	.....	Up 15 cents	.....
Dec. 16, 1931	Cut 15 cents	.....	.....
Apr. 1, 1932	.....	Up 15 cents	.....
Apr. 25, 1932	Up 20 cents	.....	.....
June 26, 1932	.....	.....	Up 25 cents
Oct. 15, 1932	.....	Up 12 cents	.....
Dec. 15, 1932	.....	Down 35 cents	.....

Official Postings and Differentials

(Revised to December 30, 1932)

CALIFORNIA: (Effective June 26, 1932).

Signal Hill, Seal Beach, Alamitos Heights, Huntington Beach, Olinda-Brea Canon, Torrance and Richfield: 14 to 19.9 gravity 65 cents; 20-20.9 gravity 69 cents; 21 gravity 74 cents; 22 gravity 79 cents; 23 gravity 84 cents; 24 gravity 89 cents; 25-25.9 gravity 93 cents; top posting for Torrance and Richfield; 26-26.9 gravity 97 cents, top price for Seal Beach, Alamitos Heights and Huntington Beach: 27-27.9 gravity $1.00; 28-28.9 gravity $1.03, the top price for Olinda Brea Canon: 29-29.9 gravity, $1.06; and 30-30.9 gravity $1.09, the Signal Hill top posting.

Inglewood: 14 to 19.9 gravity 65 cents; 20-20.9 gravity 71 cents; 21 gravity 77 cents; 22 gravity 82 cents; 23 gravity 87 cents; 24-24.9 gravity 92 cents, the top price.

Playa Del Rey: 14 to 19.9 gravity 65 cents; 20-20.9 gravity 69 cents; 21 gravity 74 cents; 22 gravity 78 cents; 23 gravity 82 cents; 24 gravity 86 cents; 25 gravity 91 cents; 26-26.9 gravity 96 cents, the top price. Field gathering charges of 5 cents a barrel.

Athens, Rosecrans and Dominguez: 24-24.9 gravity 89 cents; 25-25.9 gravity 93 cents; 26 gravity 97 cents; and 27-27.9 gravity $1.00 with three cents additional for each degree gravity upward, ending at 32-32.9 gravity $1.15.

Elwood Terrace: 33-33.9 gravity $1.04 and 6 cents more for each additional degree of gravity, ending with 37-37.9 gravity $1.28, all prices f.o.b. ship.

Whittier and La Habra: 14 to 19.9 gravity 65 cents; 20-20.9 gravity 68 cents; 21 gravity 72 cents; 22 gravity 77 cents; 23 gravity 83 cents; and 24-24.9 gravity 89 cents, the top price.

Montebello: 14 to 20.9 gravity 65 cents; 21-21.9 gravity 67 cents; 22 gravity 70 cents; 23 gravity 73 cents; 24 gravity 76 cents; 25-25.9 gravity 80 cents, the top price.

Coyote Hills: 14 to 20.9 gravity 65 cents; 21-21.9 gravity 66 cents; 22 gravity 70 cents; 23 gravity 76 cents; 24 gravity 81 cents; 25 gravity 86 cents; 26 gravity 90 cents; 27 gravity 94 cents; 28 gravity 98 cents; 29 gravity $1.02; and 30-30.9 gravity, $1.05, the top price.

Santa Fe Springs: 24-24.9 gravity 73 cents; 25 gravity 79 cents; 26 gravity 84 cents; 27 gravity 89 cents; and 28-28.9 gravity 94 cents, with 4-cent differential for each degree of gravity upward to 35-35.9 gravity $1.22.

Newhall, McKittrick and Kern River: 14 to 19.9 gravity 55 cents.

Midway-Sunset, Elk Hills and Buena Vista: 14 to 19.9 gravity 55 cents; 20-20.9 gravity 59 cents; 21 gravity 63 cents; 22 gravity 69 cents; 23 gravity 75 cents; 24 gravity 81 cents; 25-25.9 gravity 87 cents and 5-cent differential for each additional degree gravity ending with 30-30.9 gravity $1.12.

Lost Hills: Same as Midway-Sunset up through 25-25.9 gravity 87 cents, then 26-26.9 gravity 91 cents; 27 gravity 94 cents; 28 gravity 99 cents; 29 gravity $1.02; and ending 30-30.9 gravity $1.05.

Coalinga: 14 to 19.9 gravity 55 cents; 20-20.9 gravity 59 cents; 21 gravity 62 cents; 22 gravity 65 cents; 23 gravity 68 cents; 24 gravity 72 cents; and ending 25-25.9 gravity 75 cents.

Wheeler Ridge: 14 to 19.9 gravity 55 cents; 20-20.9 gravity 57 cents; and 21-21.9 gravity 60 cents, with 3 cents more for each additional degree of gravity, ending 25-25.9 gravity 72 cents.

Oklahoma, Kansas, North Texas: (Effective December 15, 1932)

Magnolia: below 28 gravity 65 cents; 28-28.9 gravity 66 cents; 29-29.9 gravity 68 cents; 30-30.9 gravity 70 cents; 31-31.9 gravity 73 cents; 32-32.9 gravity 76 cents; 33-33.9 gravity 79 cents; 34-34.9 gravity 83 cents; 35-35.9 gravity 85 cents; 36-36.9 gravity 88 cents; 37-37.9 gravity 91 cents; 38-38.9 gravity 94 cents; 39-39.9 gravity 97 cents; 40 and above $1. Texas Co., Humble, Stanolind, Tidal, Gulf, Gypsy and others: below 29 gravity 53 cents; with 2-cent differential to 77 cents for 40 and above. Carter, Empire, Pure, Continental, Skelly, Sinclair-Prairie and others: below 25 gravity 45 cents; 25-25.9 gravity 47 cents; and 2-cent differential to 77 cents for 40 and above.

Texas Panhandle: (Effective December 15, 1932).

Gray County: Humble, Texas, Gulf and Danciger: Below 35 gravity 56 cents, with differential of 2 cents for each degree to 40 gravity and above, 68 cents. Magnolia: below 35 gravity 70 cents, differential 2-cents beginning 35-35.9 gravity 72 cents and ending with 40 and above 82 cents.

Carson and Hutchinson Counties: Humble, Gulf and Texas: below 35 gravity 51 cents; 35-35.9 gravity 53 cents, with 2-cent differential to 63 cents for 40 gravity and above. Magnolia: below 35 gravity 58 cents, 35-35.9 gravity 60 cents, then 2-cent differential to 70 cents for 40 and above.

West Texas: (Effective December 15, 1932).

Crane-Upton, Crockett, Ector, Howard-Glasscock, Pecos and Winkler Counties, Texas and Lea County, New Mexico: 50 cents by Humble, Gulf, Texas, Shell, and 65 cents by Magnolia.

Southwest Texas: (Effective December 15, 1932).

Refugio Heavy: 65 cents.

Gulf Coast: (Effective December 15, 1932).

Goose Creek, Hull, Liberty, Orange, Pierce Junction, Mykawa, Moss Bluff, Raccoon Bend, Barbers Hill, Sour Lake, Spindletop, Sugarland, West Columbia, Humble and Refugio Light: Humble, Gulf, Sun and Atlantic: below 20 gravity, 58 cents, with differential of 2 cents for each degree to 34 gravity which is 88 cents; The Texas Co.: below 22 gravity 65 cents with 2-cent differential to 91 cents for 35 gravity and up.

Jennings (Gulf): 60 cents; **Cameron Meadows** (Magnolia) same as El Dorado East Field. **Lockport and Iowa:** (Magnolia): below 25 gravity 68 cents with 2-cent differential to $1.00 for 40 gravity and up.

Mirando: Humble 55 cents and Magnolia 70 cents; **Salt Flat:** 60 cents; **Darst Creek:** 60 cents; **Pettus:** 80 cents; **Markham:** Same as Gulf Coast; **Lytton Springs:** 90 cents by Magnolia.

Conroe, Texas: (Effective December 15, 1932).

Humble, Texas and Tidal: Two-cent differential applies, beginning 35-35.9 gravity, 80 cents, ending 40 gravity and above, 90 cents.

East Texas: (Effective December 15, 1932).

Flat Price: 75 cents.

North Louisiana and Arkansas: (Effective December 15, 1932).

Caddo, Homer, Haynesville, Bull Bayou, Sabine, Crichton, DeSoto-Red River, Cotton Valley, Sarepta, Cartersville, Pine Island, El Dorado, Rainbow Light: Magnolia, below 25 gravity 58 cents with differential of 2 cents for each degree from 60 cents for 25-25.9 gravity to 90 cents for 40 gravity and up. The Texas Co.: below 25 gravity 59 cents with 2-cent differential to 71 cents for 40 gravity and above. Gulf: below 25 gravity 45 cents with 2 cents differential to 77 cents for 40 gravity and up. Standard: Caddo below 25 gravity 39 cents, with 2-cent differential to 71 cents for 40 and above; Homer below 25 gravity 44 cents to 76 cents for 40 and higher; Haynesville below 25 gravity 33 cents and 2-cent differential to 65 cents for 40 gravity and above; Sabine, DeSoto and El Dorado below 25 gravity 42 cents with 2-cent differential to 74 cents for 40 gravity and above; Sarepta-Cartersville below 25 gravity 35 cents and 2-cent differential to 67 cents for 40 gravity and above.

Smackover: (Effective December 15, 1932).
Standard 35 cents, Texas Co. and Gulf 50 cents, and Magnolia 65 cents.

Rocky Mountain States: (Effective December 16, 1932).

Salt Creek: Below 29 gravity 76 cents; 29-29.9 gravity 78 cents with differential of 2 cents each degree to 40 and above. Top price $1.00.

Elk Basin and Grass Creek: 87 cents; **Big Muddy:** 75 cents; **Lance Creek:** 92 cents; **Rock Creek:** 67 cents; **Sunburst:** (effective November 7, 1932): 75 cents; **Osage: 98 cents; Cat Creek: $1.20; Pondera:** 90 cents; **Hogback, New Mexico:** 80 cents.

Mid-Western States: (Effective December 16, 1932).

Lima: $1; Indiana: 52 cents; **Illinois:** 87 cents; **Princeton:** 87 cents; **Wooster:** 95 cents; **Western Kentucky:** 82 cents.

Pennsylvania: (Effective October 3, 1932).

Bradford District: $1.72; National Transit Oil: $1.72; Southwest Pennsylvania Pipe Line Oil: $1.42; Eureka Pipe Line Oil: $1.37; Buckeye Pipe Line Oil: $1.22; Corning Crude: 85 cents.

Michigan: (Effective July 13, 1932), **Midland:** 85 cents a barrel. **Muskegon:** 75 cents to $1.00 a barrel.

Canada: (Effective November 3, 1931).

Petrolia: $1.90; Oil Springs: $1.97.

Trying for Extensions in Midway and McKittrick

Taft, Calif.—Extension tests in the Midway-Sunset and McKittrick districts are expected to show possibilities immediately outside the proven limits of fields that have produced from various levels for many years. Only a limited amount of drilling should be expected during the immediate future, but an important discovery might revive field operations.

Lavin, Avery and Jordan have made location for a well on Section 20-11-23, a short distance south of the Sunset field. An effort will be made to extend the field a short distance.

Drilling in the McKittrick district has been limited, but the small amount of oil developed outside the accepted proven limits has encouraged a few operators to continuation along their original plans. Ozena Oil Company has developed a small production in No. 1, Section 27-29-21, at 3025 feet, a yield of about 35 barrels of 24 gravity oil having been obtained on the pump. T. H. Purman is drilling below 5340 feet in No. 1, and still has a chance to fill in the gap between two producing fields. The formation is running to gray sand and shale.

North Dome Offset Campaign Underway

Coalinga, Calif.—The large number of good producers on the northwest flank of the North Dome at Kettleman Hills does not seem to satisfy operators, and completion of additional wells will follow the offsetting program which has been responsible for present producers. This northwest section has been unusually productive, and has shown a slower decline than would be expected where several large wells are completed in a limited area.

Standard Oil Company has made location for No. 8-21J, Section 21-21-17, and will offset Superior Oil Company's Huffman lease to the southwest and Kettleman North Dome Association's lease to the west. This new location is just outside the original "red" line which marked the accepted proven limits of the field, but should make a producer.

Superior Oil Company has completed rig for Huffman 5, fifth well to be started on the 160-acre Huffman lease on the northwest flank. All of the four wells completed on this lease have been large producers. Huffman 1 produced more than 3,650,000 barrels during the first year for an average of more than 10,000 barrels daily. One of the four completions came in with an even higher initial production than the first producer, but it was not allowed to produce at a maximum rate for a long period.

Union Oil Company is drilling below 4000 feet in King 3, third well to be started on a 160-acre lease in the northwest sector. The first two wells were very large producers and were completed at 8310 and 8500 feet.

Enough drilling has been done to define the limits of the field fairly well, and an effort will be made to describe one line around the North Dome. This will eventually be accomplished by pushing the "blue" line in and pushing the "red" line out where it is necessary. The red line was the original accepted proven boundary, while the blue line was drawn as possible producing territory. As leases between these two lines fail, the blue line will gradually disappear.

Operators Still Seeking Settled Mesa Production

Santa Barbara, Calif.—The shallow Mesa field, an unimportant producing district just outside the Santa Barbara city limits, is still the object of search by a few small operators who hold to the belief that a steady production can be developed at some point on the

North Belridge Importance Established by Good Well

Los Angeles.—The North Belridge field has established itself more firmly, as the result of the recent completion of Belridge Oil Company's No. 51-27 with an initial production of 6500 barrels of 40.6 gravity oil and 7,300,000 cubic feet of gas through one bean. This was by far the most important completion of the week and further emphasized the importance of the upper Temblor formation at North Belridge. No. 51-27 was drilled to 5450 feet and is producing from the same zone which yielded the discovery well two years ago. Completion of such a large well would ordinarily endanger curtailment, but Belridge Oil Company has observed the field allowable in the face of a chance to produce a much higher total.

The North Belridge field has been recognized for two years as an important producer in the upper Temblor, but the most recent completion proves the area to be an economic factor for future consideration. The upper portion of the formation will not be productive over a large area, but the average initial flow of the few wells completed on top of the structure has been high, while the oil has been very light and desirable.

Completion during the middle of 1932 of a large producer around 8000 feet opened a new producing zone at the base of, or below the Temblor formation. This gave a few operators who had failed in the top of the Temblor, new hope and they are trying for production at a much greater depth. The identity of this very deep formation has not been definitely established, but it is probably the Eocene or Oligocene. It is doubtful whether the Temblor is more than 3000 feet thick.

Ohio Oil Company is coring below 8025 feet in Bloemer 1, a deep edge test which was a failure in the upper Temblor. The formation is showing oil and gas, and the outlook is especially favorable. The lower zone may underlie a greater area than the shallower zones, but a gas pressure does not necessarily point to a large production of light oil. This is one of two or three wells which were outside the producing limits in the upper Temblor, and a successful completion would lead to additional drilling on the fringes of the field.

Large Well Brought In At North Belridge Field

Los Angeles.—Six wells were completed in California during the week, Belridge Oil Company's No. 51-27, Section 27-27-20, in the North Belridge field having been by far the most important new producer. Total initial production was 7675 barrels. Only one well was an outright failure, but it had been considered a doubtful wildcat for some time. No gas wells were completed during the week.

Company, Well and Location	Initial Production Bbls.	Depth
Long Beach—		
Carson Oil Co., No. 13.....	300	4795
Hoyt and Wilson, Merritt 1	75	6720
North Belridge—		
Belridge Oil Co., No. 51-27, 27-27-20	6500	5450
Continental Oil Co., Result 3, 36-27-20	500	5331
Mesa—		
Raberta Oil Co., Rascop 1, 28-4-27	250	2091
Playa del Rey—		
Cooperative Development Co., Mesmer 1, 26-2-15 ...	*	6695

structure. A few small completions have been recorded, but no outstanding wells were completed at any level. The cost of drilling to the 2100-foot producing zone is small, and the hope of steady production has been the prompting medium for a limited amount of drilling. The field is producing about 650 barrels daily, and should never become a factor in the heavy oil column. The discovery well was perhaps the best of any completed, but even this original producer soon went to water in 1928. The rush to drill the field resulted in an almost complete failure. After all of the larger operators had abandoned the field, a few of the smaller companies succeeded in completing shallow pumping wells. The faulted condition of the district and the fractured zone apparently prevented a satisfactory accumulation, although crossing of the major fault line has proved a wise move.

Location of the field and small cost of drilling have attracted small operators. Some of the most recent completions have come in with good initial flows, when agitated on the pump, but the daily average settles fast.

A pipe line was started from the field, but no outlet has been provided except by trucks and tank cars.

Two Tests Will Determine San Miguelito Extension

Ventura, Calif.—The size and something of the producing trend of the new San Miguelito field should be determined by completion of the two wells under way. Although the field is definitely in the proven column, the wells under way are regarded as efforts to extend the producing limits slightly.

Chanslor-Canfield Midway Oil Company is grading roads for Hobson A-3, an indirect offset to the discovery well, and will try for a completion slightly below 7000 feet. This company was first to obtain production in the field, but the yield on the compressor was small, and was not regarded as commercial in some quarters. This test, Hobson A-2, was drilled to 10,030 feet, and was the first well to pass the 10,000-foot mark. It was plugged back to produce on the compressor from around 7900 feet.

Honolulu Consolidated Oil Company has drilled out the cement below the 13⅜-inch casing at 3155 feet, and will deepen from 3206 feet in Valenzuela 1. Progress has been slow in this well, due to landslides and other difficulties.

The San Miguelito field has assumed a more important position than it was originally given, and it is expected to become at least a good secondary producer.

Many California Wildcats Approach Critical Depths

Los Angeles.—Shutting down of a few wildcats in California during the week was offset by spudding in a few others and resumption of operations in two or three districts. The tests are widely scattered, and many are approaching critical depths.

In Kern County, at Devil's Den, A. S. Halladay's No. 1, Section 11-25-18, is drilling in hard shale at 1147 feet. Thomas Hannah's No. 1, Section 25-25-18, has been shut down at 3455 feet. Pyramid Hills Oil Company's No. 1, Section 24-25-18, will be drilled deeper from 2240 feet after the rig is repaired.

At Lost Hills, Associated Oil Company et al have spudded Williamson 1, a deep test on Section 2-26-20.

In the McKittrick District, Ozena Oil Company's No. 1, Section 27-29-21, is still pumping a small amount of 40 gravity oil from 3025 feet. T. H. Purman's No. 1, 22-29-21, is drilling in hard gray sand and shale at 5340 feet.

At Semitropic, Milburn and Shirman's No. 1, Section 29-25-21, is being rigged up with an outfit from Kettleman Hills.

Santa Barbara County

At Carpenteria, Casitas Oil Company's ocean Permit 202-2, has been shut down at 3312 feet, and equipment removed.

Off Coal Oil Point, Bolsa Chica Oil Corporation's Augur 191-1, an ocean test, is idle at 4089 feet, but another well may be drilled.

At Lompoc, O. C. Field Gasoline Corporation's McLean 1, Section 6-7-33, has been shut in at 3162 feet. Meganos Oil Company's No. 1, Section 28-8-34, is a location, but work will not be started for sometime.

On Santa Rosa Island, Standard Oil Company's Island 1 is drilling in hard gray sand at 5775 feet, but has reported no showings.

Ventura County

Near Conejo, International Oil Producers' Powell 1, Section 33-2-20, is drilling in volcanics at 2433 feet.

In the Fillmore district, Sovereign Oil Company's Leavens 1, Section 23-4-19, is drilling in shale and streaks of oil sand at 2240 feet.

In the Hopper Canyon area, Bardeen Petroleum Company's Lankershin 2B, Section 13-4-19, is pumping some 30 gravity oil from 2775 feet. Commander Oil Company is trying to locate the water in Fennel 1, Section 13-4-19. Hancock Oil Company's Hadley 5 is being rigged to deepen from 1015 feet.

At Rincon, Woodrow Petroleum Company's Woodrow 1, Section 4-3-24, is fishing for drill pipe at 6108 feet.

Near the San Miguelito field, Chanslor-Canfield Midway Oil Company's Hobson A-3, Section 23-3-24, will be started when roads and rigs are completed. Honolulu Consolidated Oil Company's Valenzuela 1, Section 23-3-24, is drilling out cement at 3206 feet for deepening to completion point around 7000 feet.

At Sespe, H. A. Ivars' Star 7, Section 1-4-20, is reaming to bottom at 1710 feet after recovering iron from the hole. No report was received from Topa Topa Oil Company's No. 1, Section 33-5-19, on account of bad roads.

At Simi, C. L. Anderson's Marr 12, Section 36-3-18, was a location.

On Sulphur Mountain, Wilshire Annex Oil Company's Thompson 1, Section 20-4-21, was reaming to bottom at 1428 feet.

In the Timber Canyon district, Superior Oil Company is bailing above plug at 3840 feet, after drilling to 6885 feet in West 3.

Miscellaneous

In Kings County, Knudsen and Schmidt's Avenal 1, Section 36-23-17, is drilling out cement at 5767 feet after running 4¾-inch casing to bottom. Dudley Dome Oil Company's No. 1, Section 9-23-20, is drilling in gray shale at 3010 feet.

In Fresno County, Emerich Oil Company's No. 1, 35-13-13, has material assembled for drilling operations. Graham-Loftus Oil Corporation's No. 1, Section 20-15-18, is drilling in sand and hard shale at 1900 feet.

In Monterey County, Western Gulf Oil Company's Johnson 1, Section 29-12-2, was drilling in gray sand at 2950 feet.

In Merced County, Los Banos Petroleum Company's No. 1, Section 26-10-9, has been shut down and permit to drill cancelled.

In San Luis Obispo County, Shell Oil Company's Mahoney 1, Section 4-25-12, will test small showings at 4077 feet. Kent and McDonald's No. 1, Section 3-32-22, is repairing rig at 3805 feet.

Southern California

At Hawthorne, Williams Oil Company's No. 1, Section 23-3-14, is a rig and work will be started soon.

Near Lynwood, Leonard F. Roberts'

Specht 1, Section 29-2-12, has completed foundation and may start work soon.

In the Newhall district, W. L. Alexander's Alexander 1, Section 1-3-16, was drilling in shale at 450 feet and will continue to the shallow producing zone. W. T. Ball's Newhall 1, Section 34-3-16, was drilled to 1700 feet and shut down. Fred J. Garliepp's No. 1, Section 14-3-16, was awaiting more material. Naval Reserve Oil Company's Trumble 1, Section 6-3-15, is bailing fluid from 1600 feet.

At Newport, Nuoil Company's Banning 2, Section 29-6-10, was fishing for liner at 1975 feet.

Near the Playa del Rey field, Cooperative Development Company's Mesmer 1, 26-2-15, has been abandoned at 6696 feet.

At Fernando, Willard Marble's Lake 1, Section 6-2-16, is repairing boilers at 1600 feet.

At San Juan Capistrano, Mineral Exploration Company's Echinique 1, Section 8-8-7, has been shut down temporarily at 4295 feet.

In the Wilmington district, Pacific Oil Investment Company's Lupie 1, Section 28-4-13, has been drilling in shale to 1326 feet and will deepen. Wilmington Terminal Oil Company's Banning 1, Section 28-4-13, will deepen from 60 feet with new rotary outfit.

In Riverside County, Harry J. Keeley's Damron 1, is awaiting new rig.

In San Fernando County, Great American Oil Company's English 1, Section 18-2-8, is drilling in sand and shale at 1110 feet.

Seven Permits to Drill Granted in California

Los Angeles.—Permits to drill new wells in California totaled seven during the past week, the average for each weekly period having been higher during the fall months than during the summer. Not more than one permit was granted for any one field or district during the current week except at Long Beach.

At Long Beach, Bess and Hughes, Inc., obtained a permit to drill Kronick 1, Section 24-4-13, and West American Oil Company started No. 10, Section 19-4-12.

In Riverside County, Harry J. Keeley was granted a permit for drilling Keeley-Damron 1, Section 21-4-6.

In the Newhall district, Big 4 Oil Company obtained permission to start Brona 1, Section 32-4-16.

In the Sunset area, Ralph Lavin, Harrie P. Avery and D. W. Jordan started No. 2, Section 20-11-23.

In the Buttonwillow gas field, Milham Exploration Company obtained permission to drill S. P. 41-1, Section 1-28-22.

At Mt. Poso, Shell Oil Company started Vedder 6, Section 9-27-28, to offset producing wells in adjoining leases.

Test Northeast of Lost Hills Will Explore Greater Depth

Bakersfield, Calif. — Seminole Oil Company is building the rig for a test on Section 29-25-21, about five miles northeast of the Lost Hills field and 20 miles northwest of the Buttonwillow gas field. Continental Oil Company (Marland) drilled several core holes in the district, but did not drill its deep test in the area to a conclusive depth. The new well is in line with Shell Oil Company's Williams 1, Richfield Oil Company's Redding 1 and the Buttonwillow gas field, but it is strictly a wildcat. The rig in use was removed from Kettleman Hills.

The Buttonwillow gas field lies in the bed of the San Joaquin valley, and drilling along a line between this field and Kettleman Hills has been frequent. The Lost Hills field is also in the bed of the valley, but a gentle rise marks the field.

Try for Playa del Rey Extension Is Failure

Los Angeles.—Abandonment of Cooperative Petroleum Development Company's Mesmer City 1, a wildcat test on Section 26-2-15 and near the Playa del Rey field, removed an interesting well from the active list in the Los Angeles basin. This test was drilled to 6696 feet, and was abandoned with most of the drill pipe in the hole. Location was between the Playa del Rey and Inglewood fields, and drilling was done on the theory that an extension of the Playa del Rey field was possible. Other extensions had given the company some hope, but the structure could hardly be flat enough to extend so far and produce at anywhere near the average depth recorded in the field.

Failure of the well at abandonment depth was not absolutely conclusive, as drilling stopped in brown shale. This abandonment probably will affect drilling of the well planned by Del Rey Hills Oil Corporation on the same section.

The Playa del Rey field is located in the flats between Venice and Playa del Rey, and offers little surface evidence as to structural trend. Union Oil Company extended the field slightly, and a larger producing acreage probably will be developed on the larger leases.

Long Beach Work-Over Assumes Boom Proportions

Long Beach, Calif.—Development at Long Beach continues to gain ground, and 50 wells are now active in various parts of the field. Most of the active tests have not been started from the surface, but two or three new locations per week have been reported. A dozen additional projects will be started, but most of these will be plugging back and deepening jobs. The occasional completions around 5000 feet have encouraged operators to rush their working-over jobs to completion.

Activity centers around the "Frog Pond" district, but drilling has spread to the Los Cerritos extension and toward the southeast. Development of a sand shallower than the most recently developed zone is unusual in the Los Angeles basin, the general practice having been the drilling of deeper ones in regular order. The shallow zone around 5000 feet is not a new discovery, but during the height of the 6000-8000-foot development, it was overlooked or ignored in favor of the deeper formations. The present drilling is being done chiefly by independent operators who are anxious to develop a stable production at a small cost. Some of the townlot leases are so crowded that further drilling is out of the question. Perforation of casing above plugs set at about 5000 feet has been a fairly successful practice. Water has damaged the shallow zone in some parts of the field, but enough development will be done to determine the extent of the area which will yield profitable producers.

Plan Disposing Rosecrans Salt Water Into Formation

Los Angeles.—A novel method of salt water disposal will be tried in the Rosecrans field by Barnsdall Oil Company. The waste water from wells producing a high percentage of cut oil will be pumped back into O'Dea 9 and through perforations around 3000 feet. The water pressure at this level is very low, and it may be possible to dispose of a large quantity of waste salt water before building up a pressure in the formation.

The field does not have a waste water disposal system, and city agencies have objected to disposal through storm sewers. No oil is produced from above 3000 feet, and there is little likelihood that the water pumped into the shallow formations can do any harm. Successful water storage in the first well may be followed by disposal in other wells near the edge of the field.

Oklahoma City Allowable Fixed by Producing Zones

Oklahoma City. — The Oklahoma Corporation Commission took the first step toward changing proration methods in the Oklahoma City pool in its meeting of Friday, December 23, when it secured nominations based on geologic zones in conformity with the recent Oklahoma Supreme Court decision. Heretofore nominations have been for the pool as a whole and allowables based on flat and water exemptions and upon a percentage of the potential by wells. The state court held in the Wilcox Oil & Gas Company decision that each of the four zones is a common source of supply and that nominations must be made for each. Purchasers nominated 74,333 barrels daily for January, of which 48,171 barrels or 64.8 per cent of the total, was for oil from the Wilcox sand zone. Total nominations for November and December, 1932, were 73,510 barrels daily.

The total nomination for January, 1933, is based on a tentative nomination of 5000 barrels from Indian Territory Illuminating Oil Company on a contract which it hopes to have signed by January 1. Nominations by companies by zones are listed in an accompanying tabulation.

According to E. G. Dahlgreen, chief clerk of the proration department, there are 948 wells with a total potential of 4,531,348 barrels which he divided as follows:

Zone	No. of Wells	Total Adjusted Potential	Percentage of Potential
Wilcox	434	3,853,087	85.03
Simpson	437	647,794	14.30
Arbuckle	71	24,901	0.55
Fault Line	6	5,566	0.12

Carter Locates Wildcat In Seminole County

Tulsa.—Carter Oil Company has announced location for Community-Keokuk 1, CN½ NW NE Section 2-10n-6e, three miles north of the town of Little and about five miles northeast of the Searight pool in northern Seminole County. Acreage in the block, which is understood to consist of about 5000 acres, is owned largely by Carter Oil Company with Gypsy Oil Company and Sinclair Prairie Oil Company associated. Reports state that the block has been surveyed geophysically. In addition geological departments will have the following dry holes for structural determinations: Superior Oil Company's Davis 1, SW SW SE Section 3-10n-6e, top of Simpson 4590 feet, total depth 4593 feet, dry and abandoned September 18, 1928, with hole full of water, 1½ miles southwest of the Community location; Jarvis-Holm and Gypsy Oil Company's Dennis 1, CNW NW SW Section 4-10n-6e, 2½ miles west of the Community location, Hunton limestone 4305 to 4335 feet, total depth 4335 feet, abandoned with hole full of water March 27, 1926; Indian Territory Illuminating Oil Company's Chapekey 1, SW SW NE Section 12-10n-6e, 1½ miles southeast, Wilcox sand 4780 to 4795 feet, total depth, abandoned with hole full of water October 28, 1929; Superior Oil Company's Fay 1, SE NW SW Section 27-11n-6e, 1½ miles northwest, Wilcox sand 4770 to 4773 feet, dry and abandoned with hole full of water January 22, 1929. Only one other test, The Texas Company's McNabb 1, SE SE SW Section 3-11n-6e, has been drilled in this township. It was a dry hole at 4752 feet. It is approximately six miles north of the Community test.

Interest in this area has been manifested for several years and lease and royalty prices have commanded good figures despite the dry tests which have been drilled. Surface conditions in the northern portion of Seminole County are such that structural determinations based on surface beds are difficult. Most of the surface irregularities consist of interruption of or lessening of the normal west-northwest regional dips further complicated by en eschelon faulting which apparently does not extend far below the surface. Wilcox sand should be found between 4500 and 4600 feet.

Oklahoma City Nominations by Zones

Company—	Wilcox Sand Zone	Simpson Sand Zone	Arbuckle Limestone	Fault Line	Total**
Anderson-Prichard	None	100	None	None	100
Canadian*	465	None	None	None	465
Capitol*	270	None	None	None	270
Century	1,500	135	None	None	1,635
Continental	1,300	None	None	None	1,300
Cushing G. & R.	None	50	None	None	50
Empire	4,500	10,100	350	50	15,000
Globe	1,500	None	None	None	1,500
Philtex	5,000	None	None	None	5,000
I. T. I. O.	2,100	2,900	None	None	5,000
Magnolia	1,860	1,050	None	None	2,910
Peacock*	None	109	None	None	109
Petroleum P. L.	1,500	None	None	None	1,500
Shell	1,411	238	70	None	1,739
Sinclair-Prairie	2,550	320	130	None	3,000
Speedway*	14	None	None	None	14
Stanolind	12,799	4,000	125	76	17,000
Tidal	215	None	None	None	215
Sterling	1,000	None	None	None	1,000
Wilcox O. & G.	5,000	None	None	None	5,000
Oklahoma P. L.	3,800	6,000	200	None	10,000
Champlin*	488	125	None	None	613
Eason	783	None	None	None	783

*Estimated in full or part. **Slight discrepancy between reported totals and those shown in the tabulation.

Upon termination of the hearing Chairman Paul Walker announced that an order would be written and released as soon as possible. There remain a number of unsolved points in view of the state supreme court decision and the order is being awaited with considerable interest. Walker also announced that the general hearing on proration matters would be resumed January 5,

Lincoln County Test Shows For Producer in Wilcox

Tulsa, Okla., Dec. 30.—Amerada Petroleum Corporation encountered Wilcox sand from 4178 to 4212 feet in its Lafoon 1, NE SE NE Section 9-13n-6e, semi-wildcat test in eastern Lincoln County. It is being estimated good for 400 to 1000 barrels at total depth 4212 feet, still in the sand. Operators had a hole full of heavy black oil from Viola lime topped at 4097 feet and Simpson dolomite from 4136 to 4178 feet. Corrected gravity of oil is only 21.2, this being the second instance in Oklahoma where Wilcox oil of such low gravity has been found. Shell Petroleum Corporation was waiting on cement to set on eight-inch casing at 5085 feet with total depth at 5100 feet in its Jerome 1, CSW SW Section 8-20n-2w, approximately one half mile north and slightly west of Wentz et al's discovery will in the new southwestern Noble County pool. Top of Viola limestone was encountered at 5050 feet. Two and one half miles southeast of the discovery well Stanolind Oil & Gas Company was drilling below 4900 feet after topping Viola limestone at 4860 feet in its Kolb 1, CNE NW Section 33-20n-2w.

Oklahoma Lists 19 First Reports in Nine Counties

Tulsa.—Nineteen first reports were received from nine Oklahoma counties during the fiscal week despite the fact that practically all routine work had been brought to a standstill by the Christmas

holidays. Hughes and Creek Counties continued their neck and neck race with four starts each, Okmulgee County scoring a par with the same number. Outside of Oklahoma City where the southwestern portion of the pool is still under active development, new work in Oklahoma is confined largely to the older pools in eastern counties, to the Wewoka-Holdenville area of Hughes County, and to the new pool recently discovered between St. Louis and Pearson Switch in Pottawatomie County.

Denver Producing and Refining Company's Noe 1, recently commenced wildcat in Caddo County, is corrected to read NW SW SW Section 34-10-10w, rather than NWC SW.

One first report was made for Carter County, Carter Oil Company's Paul Robb 3, SE SW NW Section 19-1s-2w, a cellar.

First reports for Creek County were: Magnolia Petroleum's Baker 2, CEL NE NW 3-16-7e, an old well drilling deeper from an old total depth of 2833 feet now drilling below 2833 feet; F. L. Marrs et al's W. T. Wilson 1, NE C 34-18-8e, moving in material; Holmes Oil's Townsend 1, SWC NE 25-19-9e, spudded in and shut down; Johnson Oil Refining's Evans-Purcell 1, NE NW SW 29-19-9e, drilling below 640 feet.

Four first reports and one correction were made for Hughes County. Manahan et al's Tiger 2, SW NW SW 10-7n-8e, formerly reported Narcoma 2; Manahan's Tiger 3, SE NW SW 10-7n-8e, cellar; Tippett's Narcomey 1, SW SW SW 10-7n-8e, rigging up rotary tools; Robinson et al's Jacobs 2, SW NW NW 15-7n-8e, location; Watkins-Shaffer et al's L. Jacobs 1, NE SW NE 16-7n-8e, rigging up rotary tools; Royce, Walker 2, SE SE NW 22-7n-8e, location.

In Kay County, Harris and Haun's Cole 3, CE½ SE 18-29-1e, was rigging up.

Four first reports were recorded for Okmulgee County as follows: H. E. West Douglass 9, NE SW NW 22-12-13e, an old well rigging up machine to drill deeper; Penrod, Inc.'s Alexander 1-A, SE NW NE 14-13-13e, location; Bingham, M. Bosen 4, NE C 36-14-12e, rigging up; Iron Mountain Oil Company's Rinehart 4, NW NE NE 4-15-11e, shut down at a total depth of 700 feet.

In Pottawatomie County, Oklahoma Oil Corporation's Mejah 1, NWC SE 28-7n-4e, had its cellar dug; Phillips Petroleum's Mejah 1, NEC SW 28-7n-4e, building rig, was formerly reported Omego 1; James et al's Brandenburg 1, NW C NE 33-7n-4e, was corrected to be Fixico Oil's Brandenburg 1.

New location in Stephens County was Linson et al's Doss 2-A, NW SW NW 4-2s-8w.

In Tulsa County, Andy Spears' Rhodes 1-A, NWC SE 11-17-12e (twin), was a machine.

14 Oklahoma Producers Have 81,285-Barrel Yield

Tulsa.—Fifteen completions in Oklahoma pools added a total 24-hour initial of 81,285 barrels of oil and 231½ million cubic feet of gas. Of these five new wells in the Oklahoma City pool, accounted for 79,848 barrels of oil and 223½ million cubic feet of gas. Of the 20 reports on the completion list, two were dry holes and three were abandoned locations in the Wewoka-Holdenville area of Hughes County. Fifteen producing wells added 53,410 feet to the total footage drilled for an average of 3561 feet per well.

Company, Well and Location	Initial Production Bbls.	Depth
Carter County—		
Carter Oil Co., A. Hooks 1, ne sw nw 19-1s-2w .....12 hrs.	270	1768
Lundy et al, Major 1, ne se se 25-1s-3w	550	2467
Schermerhorn, Dilly 15, nw se se 24-4s-3w	40	1970
Creek County—		
Billingslea et al, Wayman 8, ne se nw 22-15-8e	125	2861
Johnson O.R., F. Boyd (Evans) 6, sec nw 29-19-9e	75	2160
Grady County—		
Lone Star Gas, Warren 1, cwl sw nw 36-4n-8w	¶8	2126
Hughes County—		
Milton & Capshaw, Holmes 1, sec sw sw 11-7n-8e.....lcn.		abd.
Robinson, Jacobs 2, nw nw nw 15-7n-8e . .....lcn.		abd.
Jacobs 3, ne nw nw 15-7n-8e.lcn.		abd.
Okfuskee County—		
F. Havel et al, Likowski 2-A, se ne sw 23-11-11e	17	2050
Oklahoma County—		
Harrell Davis, Noah 1, sw ne se 22-11-3w .....4 hrs.	¶20-2604	6576
Phillips Pet., Devore 1, ne se se 22-11-3w .....2 hrs.	¶153-999	6504
Phillips Pet., Drew 1, se nw se 22-11-3w . .....4 hrs.	¶6½-2000	6545
I.T.I.O., A. Jarvis 1, sw se nw 26-11-3w . .....7 hrs.	¶35-7286	6623
I.T.I.O. & Phillips, M.K.&T. "B" 3, ne ne se se 34-12 3w . .....4 hrs.	¶9-2542	6378
Okmulgee County—		
Misner, Colbert 6, nw se nw 14-14-14e (Twin)	70	1777
Osage County—		
Sinclair Prairie et al 1, se sw se 13-24-7e	15	2555
Pottawatomie County—		
Huckleberry, Spaulding 1, nwc 35-8n-4e	*	3890
Stephens County—		
H. Abels, Akers 6, ne c nw 11-1n-5w	5	1050
Tulsa County—		
H. Detrick, Drew 1-A, cel se nw 1-17-14e	*	1048

Two Noble County Wildcats Watched in Oklahoma

Tulsa.—The return of pleasant weather throughout the Mid-Continent brought a resumption of wildcat activities and reports this week show 13 drilling wells among the total of 29 reports carried on the wildcat list. No specific Oklahoma area bears close watching since Carter Oil Company et al's important Oklahoma County test is a dry hole and Ramsey & Eason's Duck Club test in western Logan County is running low to such an extent that it is now being accorded little chance of finding production. However, two tests in the new Wentz area of southwestern Noble County, have penetrated Oswego lime and are due to test Wilcox sand within the near future. Both will be closely watched since they probably will reveal considerable valuable information regarding location and importance of the structure. Both are said to be running slightly low as compared with the discovery well.

The Kay County test of Crawford and Long, Richards 1, SW NW Section 4-25-1w was dry and abandoned at 285 feet.

In Pawnee County the two wildcat tests were still drilling, Deep Rock et al's Crow 1, NE NE SE Section 26-23n-5e, at 450 feet, and O. M. Mainess' Schildberg 1, NW SW NW Section 27-22n-6e, at 200 feet.

Two of the three tests in Noble County showed some advancement. Lacy Rollins et al's F. Frank 1, SE SE SW Section 6-20-2w, remained a rig. Shell Petroleum Corporation's Jerome 1, CSW SW Section 8-20n-2w, had sand at 4404 feet and top of the Oswego lime at 4665 feet. Stanolind-Amerada's Kolb 1, CNE NW Section 33-20n-2w, had Prue from 4475 to 4530 feet with a show of oil, top of the Oswego lime at 4540 feet and was drilling at 4673 feet in lime.

The Logan County test of Ramsey-Eason, Duck Club 1, NW NW NE Section 10-16n-4w was drilling at 6205 feet in Mississippi lime.

O. O. Owens' Fee 1, in Creek County,

(*Continued on page 66*)

New Locations Add Interest To Kansas Wildcat Activity

Wichita, Kansas.—Due to the holiday season and bad weather which preceded it, reports from outlying Kansas wildcat tests were slow to come in and as a result the status of this week is but little changed as compared with the preceding period. One of the characteristics of wildcat activity in the state during recent months has been the scattered location of drilling wells which have caused scouts to be on the alert in a large number of areas instead of the usual play on one or two known trends. Announcement of locations during the past two weeks has tended to add to the general interest in exploratory work and within the next few weeks several interesting tests should be added to the active list.

In Sumner County, Trees et al's Springate 1, SE SE SW Section 6-34s-2e, encountered Base of the Mississippi lime at 3855 feet and was shut down at 3865 feet. In the same county, Deal Oil and Gas Company's Tompkins 1, SWC Section 26-33s-1e, had moved in machine.

In Cowley County, Roth and Faurot's Craig 1, SE Section 2-32s-3e, was drilling at 2965 feet.

Great Basin Oil Company's Landson 1, in Sedgwick County, CSE NW Section 13-28-2e, was drilling below 3484 feet.

In Pratt County, Ninnescah Oil & Gas Company's Hardesty 1, SW SE SE Section 28-27s-11w, under-reamed six-inch at 3420 feet.

The comparatively new test in Reno County, Skelly Oil Company's Cole 1, CSE NW Section 4-26s-8w, was still a rig.

In Finney County, Joe Denham's Brown 1, CSW Section 16-25s-34w, was waiting on cement to set after having set six-inch casing at 2500 feet.

Sheedy et al's Ryan 1, in Woodson County, NE SW SW Section 32-24-14e, was shut down at 1360 feet after having set eight-inch casing at 1294 feet.

In Harvey County, Phillips Petroleum Company's Weibe 1, NE SE NE Section 30-23s-2e, was drilling below 325 feet.

In McPherson County, Holcomb & Trummer's Waltner 1, SW NE SE Section 19-20s-2w, remained a location.

Sinclair Prairie Oil Company's Wilhelm 1, in Ness County, CSW SW Section 16-19s-21w, was drilling below 3020 feet.

Rice County Show

In Rice County, Ramsey et al's School Lot 1, NW SW NW Section 32-19s-9w, had tested a hole full of oil and swabbed 13 barrels per hour for 12 hours with a small show of water.

In Marion County, Vernon-United Petroleum's Schmidt 1, SW SW NW Section 35-19s-1e was still shut down for repairs after having encountered Misener sand at 3215 feet. In the same county, Ferrell et al's Williamson 1, CNW SE Section 21-19s-4e, was still shut down at 1100 feet.

In Barton County, another Sinclair Prairie Oil Company wildcat test, Turgeon 1, CNE NW Section 3-16s-12w, was drilling below 1640 feet.

In Ellsworth County, Mid-Kansas Oil & Gas Company's Kanak 1, NE NE SW Section 15-16s-7w was drilling below 355 feet.

Dieter et al's Fulton 1, SW SW NW Section 14-16s-2w, in Saline County, was still a rig on ground.

In Ellsworth County, reports on the five wildcats were: Raymond Gear and Hannah's Groboth 1, SE SE NW Section 12-15s-10w, was shut down for water at 2645 feet; Sinclair Prairie Oil Company's Malir 1, CNE NE Section 27-15s-8w, also was shut down for water, at 1132 feet; Henry et al's Arensman 1, CSW SW Section 10-15s-7w, was still a rig; Bickford's Burke 1, CNW SW Section 14-14s-9w, was still shut down after spudding 50 feet; Gurley Brothers and Barnsdall Oil Company's Union Pacific 1, NW NW SW Section 7-14s-7w, was drilling below 3084 feet.

In Graham County, Schleimeyer et al's Smith 1, SEC Section 24-8s-25w, was cleaning out at 3615 feet.

Moving in to Deepen Offset To Producer in School Land

Guthrie, Oklahoma.—Shell Petroleum Corporation is moving in tools to deepen Story 1, SE SE SW Section 30-19n-4w, north offset to Cosden Incorporated's Gardner 1, which was deepened and recompleted in School Land sand this week. Story 1 was completed in November, 1929, making 1870 barrels initially from a total depth of 5946 feet in Wilcox sand. This will be the third old Wilcox producer to seek the School Land pay since deepening of Shell Petroleum Corporation's McCully 6, last year.

Six Kansas Producers Yield 1921 Barrels

Wichita, Kansas.—Although field work had been resumed following the holiday season the handicap of bad weather which preceded Christmas plus the fact that a large number of tests were shut down until after the first of the year, materially shortened the completion report and only 11 wells were taken from the active list during the fiscal week. Of this number one was an abandoned location, and three were dry holes.

Exploratory and development work in the state has been at its lowest ebb in many months as the year end has approached and a general pick up is anticipated early in January, 1933. Rumors of important locations to be made shortly after the first of the year were expected to materialize. At the present time the state has only two flush areas of importance. The Ritz-Decker-Garrett pool of McPherson County is now over two years old and has shown a very material decline although it as yet cannot be expected to pass out of the flush picture suddenly since it will be the scene of a considerable amount of new work during the coming year. The several pools which constitute what is known as central western Kansas or the Barton-Ellsworth Arch, have given indication of being relatively small and anything of vital importance in that area apparently must come from tests yet to be drilled.

Company, Well and Location	Initial Production Bbls.	Depth
Greenwood County—		
Gore and Markus, Davis 2, cne se 6-24-12e	*	1836
McPherson County—		
Twin Drlg., Phillips & Shell, Wyles 2, sw nw ne 25-19-2w.	131	2980
Wolf Creek et al, Krehbiel 3, nwc 25-19-2w	716	2973
Dave Morgan, Decker 1, nw ne nw 11-20-3w .....4 hrs.	140	3028
Slick-Pryor-Lockhart, Stucky 2, swc 27-20-3w .....23 hrs.	827	3433½
Reno County—		
Olson & Shell, Rudicel 2, cnw sw 24-23-4w .....per hr.	7	3386
Sedgwick County—		
Covell et al, & Barnsdall, Rapp 1, nec 21-26-2e (owdd).....	*	3384
W. A. Cameron et al, Landon 1, cse nw 13-28-2e	*	3516
Woodson County—		
Nye & Kilby, Shafer 3, ne se sw 31-23-14e	100	1574

Barton-Ellsworth Test Shows For Small Oil Producer

Wichita, Kansas.—LeBow et al were cleaning out to run five-inch liners in Ellis 1, CSW SW SE Section 16-19-9w, northeast diagonal offset to Muth Brothers' Byers 1, which was completed February 7, 1931, making 15 barrels initially from 3244 feet. Six-inch casing was set in Ellis 1 at 3188 feet, 14 feet above top of the conglomerate. First oil was encountered at 3206 feet and the pay at 3222 to 3225 feet. At 3230 feet operators had 1500 feet of oil in the hole, an accumulation of three days. This test, which apparently will make a small well in the conglomerate, again proves the spotted nature of production in the Barton-Ellsworth Arch area. Dry holes have been drilled in Sections 33 and 34 of the same township.

Mid-Kansas Oil & Gas Company was drilling ahead below 1790 feet after finding 2,500,000 cubic feet of gas at 1765 feet in Kanak 1, CNE NE SW Section 15-16s-7w, Ellsworth County wildcat test located about eight miles southeast of the town of Ellsworth and slightly over 1½ miles east of Phillips Petroleum Company's Hochman 1, NE SW SE Section 17-16s-7w, a dry hole in Arbuckle "Siliceous" lime at 3065 feet.

In northeastern Barton County Sinclair Prairie Oil Company was drilling below 3065 feet in Turgeon 1, CNE NW Section 3-16s-12w, four miles northeast of the town of Verbeck and approximately two miles northwest of the old Orlando Petroleum Company's Shauft 1, SEc NW Section 11-16s-12w, completed as a dry hole on December 1, 1924, after drilling to 3519 feet. The Turgeon test is one of the most interesting in western Kansas by reason of its location. The company's Davidson 1, NWc SE Section 4-16s-11w, six miles to the east, was completed for an estimated 200 barrels at a total depth of 3340 feet. It is now rated at 75 barrels but has been shut in lacking outlet.

Vickers Petroleum Company's Stoltenberg 1, CNW NE NW, Section 27-16s-10w, shut in since May 23, 1932 when Stanolind Crude Oil Purchasing Company withdrew as a purchaser in the area, was reopened December 13 and is producing at the rate of 400 barrels of oil and 125 barrels of water daily. Production between the date of reopening and 7:00 a.m., December 27 was 4070 barrels of oil. The well originally was completed May 4, 1932, making 400 barrels in 12 hours from Arbuckle "Siliceous" lime at 3331 to 3335 feet. Top of the lime was reported at 3304 feet.

In the south end of the Ritz pool, McPherson County, Mohawk et al were drilling inside the five-inch liner at 3370 feet and carrying a string of five-inch casing in McGill 1, CSW SW NE Section 7-20s-1w. The well was originally completed November 10, 1931, producing 681 barrels from Viola lime at 3406 to 3408 feet. It was drilled deeper and recompleted June 14, 1932, making nine barrels of oil and 20 barrels of water on the pump. The present deepening is due to discovery of deeper production in Wilcox sand in Palmer et al's Winn 3, SEc NW Section 7-20s-1w. Tom Palmer, operator of this well, has applied to the Public Service Commission for discovery rights and asked that Wilcox sand be designated as a separate common source of supply. In event of the granting of this request Phillips Petroleum Company has agreed to take 500 barrels daily from the common source. Should no objection be voiced by January 1, the commission has indicated the request will be granted.

Hollow Area

Phillips Petroleum Company's Warkentine 2, NW SW SW Section 20-22s-3w, in the same section with the discovery well in the Hollow pool, found top of the chat horizon at 3193 feet, had 1½ bailers of water from 3209 to 3216 feet, and a show of oil from 3223 to 3226 feet. It was drilling ahead in lime at 3242 feet and carrying 800 feet of water in the hole. Drilling will be continued to Hunton lime from which the discovery well is producing.

Marion County

Hinkle et al found top of the chat horizon at 2803 feet and had a hole full of water at 2821 feet in Weyand 1, CSW SE NE Section 14-19s-1e, wildcat test three miles north of the town of Lehigh in western Marion County.

Only Eight Locations in Kansas During Holidays

Wichita, Kansas.—Scouting departments laboring under the handicap of Christmas vacations and in several instances illness of field men, reported only eight new starts during the fiscal week in Kansas. Although new work had slown down to some extent reports for the fiscal week probably do not represent the true state of affairs. Among the reports which were available, McPherson County led with four, and one each came from Franklin, Rice, Sedgwick, and Woodson Counties.

It is reported that G. A. Stearns, Wichita oil operator, will start a well shortly after the first of the year, probably in the southeast corner of Section 17-25s-1e, slightly over a quarter mile southwest of Continental Oil Company's Goodrich 1, discovery well in the old Goodrich pool. Although definite location has not been announced Stearns own three 80-acre tracts in fee and the test will be on one of them. The Stearns test will be the first west of the discovery well, which has produced more than 800,000 barrels since its completion in the chat horizon in December, 1928. Several wells to the east of it are producing from Misener dolomite at about 3300 feet. Keith et al's, Ora Jackman 1, NW SE SW SW Section 15-25s-1e, listed below as a first report, is a south offset to Rosenthal et al's Pinson, a Misener dolomite producer.

First report was made of a test in Franklin County which was also an abandonment. Judd et al's Fee 1, csw nw 16-16-18e, encountered broken sand at 1116 to 1120 feet with 260,000 feet of gas and was dry and abandoned at a total depth of 1210 feet.

Four first reports were made for McPherson County. Wolf Creek Oil et al's Dunsford 1, SE SE SW 23-19-2w, was an old well rigging up to drill deeper. Collingwood et al's McGill 1, NW SE 7-20-1w, a location; Lario Oil & Gas et al's Wilke 1 CSE NE 34-20-4w, rig; Mid-Kansas Oil & Gas Company's Schmidt 2, SW NW NE 33-21-3w, ponds.

In Rice County, Liggett's Thoden 1, CNW NW 11-21-7w, had its rig up.

In Sedgwick County, in the Goodrich area, Iral Keith et al's Ora Jackman 1, NW SE SW SW 15-25-1e, set 15-inch casing at 104 feet and was drilling below 1050 feet.

In Woodson County, R. S. Smith and Sinclair's McClaskey 1, SE SW SW 20-23-14e, was rigging up machine.

Gladewater Well Still Putting Oil in Water Sand

Longview, Texas.—The equivalent of an uncontrolled well on semi-open flow in the Gladewater section of the East Texas field has been allowed to carry on unrestricted in delivering oil into the Carrizo 700-foot fresh water sand centering on the southwest corner of the D. Ferguson Survey, since midsummer of 1931. The Texas Railroad Commission renewed its efforts to have this underground waste eliminated at a hearing held here December 23, as surrounding property owners are becoming indignant, but again found itself blocked by a permanent federal court injunction possessed by the largest producer of the seepage oil from the shallow sand. Engineers of the commission have estimated that the well, or wells responsible for the migration of oil into the upper sand have injected more than 1,000,000 barrels into same.

Eight flowing wells have been completed in the shallow sand by the Richardson-Callahan Syndicate (R. N. Moses and A. E. Manning, trustees), Humble Oil & Refining Company and Rancho Oil Company. The former is credited with having produced about 37,000 barrels of merchantable oil during November from its four shallow wells, and is drilling a fifth, with production from same limited only by ability to market and transport same. Rancho Oil Company has two shallow wells, but has observed the proration allowable per well and in doing so has received the posted price at all times. Humble Oil & Refining Company's first well, known as Carter 9-X, was completed November 12 flowing 32 barrels hourly, 15 per cent fresh water, via one-inch choke from sand at 660-695 feet, and averaged above 500 barrels daily during the remainder of the month.

No official of the commission is permitted to officially set foot on the property of the Richardson-Callahan Syndicate, as the latter obtained a temporary injunction against the commission through Federal Judge Randolph Bryant, October 29, 1932. This injunction has since been made permanent. The company has continued to run its production during the supposedly complete suspension of all production of the field since noon December 17. It enjoys the common carrier facilities of a major pipe line company, due to said company having been made a party to the federal court injunction, in moving a portion of the shallow production to distant markets, particularly Dallas. It is reported that oil from this particular property has been selling for 25 cents per barrel at the well and after relieved of the fresh water content, which settles out rapidly, for several weeks.

Charges have been made, but not under oath, that a regular deep producer situated near the southwest corner of the Ferguson Survey, has been subjected to a casing perforation near the Carrizo sand for the purpose of loading the shallow water horizon with oil. The commission has data on a particular well that developed a bad casing immediately upon completion, and some effort was made to install a packer on the tubing as a means of checking the leak.

Since the Longview hearing failed to offer any encouragement of the seepage oil situation being corrected promptly, other nearby lease owners now plan to seek federal court injunctions against interference by the commission and make the most of their migratory oil opportunities.

Don Josey, an official of Rancho Oil Company, Fort Worth, agreed at the hearing to close in the two shallow wells of his company if a complete shut-down could be attained.

Van Adds Oil Well and Gasser; One Test Drilling

Tyler, Texas.—A dry gasser and a small oil producer were added to the unitized section of the Van field within the past week. The Texas Company's R. V. White 5, located in northwest corner of 15.5-acre part of 34.95-acre tract and on the northwest edge of production, failed to yield oil after repeated swabbing tests from broken Woodbine sand logged at 2756-2902 feet, and has been capped as a gasser rated at 3,864,000 cubic feet daily, based on three-hour gauge through 11/16-inch choke on 2½-inch tubing.

Pure Oil Company's Mertie Elliott 3, located near the south end of production and in the southwest corner of 101-acre tract, A. H. Wiley Survey, registered an initial flow of 3¾ barrels of oil per hour on three-hour gauge via ¾-inch choke on 2½-inch tubing set at 2910 feet, but quit flowing when changed to 11/16-inch choke. This outpost logged broken sand at 2808-2936 feet.

The only active drilling test in the field proper is The Texas Company's W. H. White 2, located in the southeast corner of 20-acre lease, John Walling Survey, and in prolific section. This test logged first oil sand at 2545 feet, and is drilling ahead below 2600 feet. A list of completions follows:

Van Field

Company, Well and Location	Initial Production Bbls.	Depth
Pure Oil Company, Mertie Elliott 3	100	2936
The Texas Company, R. V. White 5	¶3¾	2902

Salt Water Removes Leon County Wildcat Threat

Tyler, Texas.—The only outstanding threat of a wildcat oil strike in the Woodbine sand belt of East Texas was again removed from the horizon when the Buffalo structure test of Shell Petroleum Corporation et al on the Wm. Phillips land, E. A. Swayze survey, Leon County, tested salt water on December 28 from the upper section of the Woodbine sand at 6054-68 feet. This wildcat swabbed and later flowed salt water from the lower sand at 6146-57 feet on December 13. It had previously cored and recovered oil and gas saturated sand from the two horizons, indicating good prospects of opening a new pool, and in an entirely virgin section of the Woodbine belt. A hard section of shale separated the two sand horizons. The hole had been plugged back to 6100 feet with cement to give the top sand a production test.

Never before in the history of Woodbine sand production in Texas has a test logged as much saturated sand as taken in by the Buffalo structure test without yielding oil. It also holds the distinction of having logged the sand at a lower depth than any other test, but same is due to other wildcats having abandoned prior to reaching the sand depth in the south end of the Woodbine belt.

In all probabilities a second test on the structure will be drilled promptly by Shell Petroleum Corporation and its seven associates rather than to surrender the acreage on a large part of the block within two years by reason of lease expirations. A site to the east, or northeast will likely be chosen.

Anticipate Breaks in East Texas Trunk Lines

Tyler, Texas.—Upon the resumption of operation of high pressure crude gathering lines in the East Texas field and the trunk lines leading to distant points during the current week, a number of line breaks are anticipated. The natural tendency of this crude to con-

geal when exposed to low temperatures, if not kept in motion, causes pipe line operators to evade shutdowns in the winter months if possible. Heretofore, brief shutdowns have been followed by line breaks when carrying a line pressure of 300 pounds in comparison to a normal operating pressure of 700 pounds and above. The suspension of transportation of oil within and away from the field on December 17 occurred at the time an unsually cold spell prevailed.

Six East Texas Wildcat Tests Quit With No Results

Tyler, Texas.—Abandonment of six wildcat tests within the past week made a deep inroad in the volume of activity taking place in the East Texas district. Wood County dropped two deep tests from the report, while one failure each was credited to Henderson, Franklin, Ellis and Upshur Counties.

Wood County's dual contribution to the dry hole list for the week marks the climax of a futile race for discovery honors on a structure in the eastern part of the county. F. B. Parriott and J. S. Hanlon's J. H. Harvey-Stuart 1, M. H. Ussery survey, yielded salt water only when given a drill stem test in Woodbine sand formation at 4950-5148 feet on December 24. D. Replogle and Sinclair Prairie Oil Company's John Saner 1, J. M. Chandler survey, withdrew from the race several weeks ago after reaching a depth of 4379 feet, with key formations running somewhat lower than the above wildcat, and the owners have signified intentions of plugging.

Frank Buttram et al's D. F. Smith 1, located in the Jamestown semi-wildcat section of Upshur County, was ordered abandoned as a junked hole in sandy-shale at 3718 feet when drill stem parted while attempting to make a formation test. A twin location will be drilled promptly.

In Franklin County, the Franco Oil Company (Mills-Harper & McGee)'s L. S. Harper 1, W. N. Dawson survey, failed in its prolonged efforts to get a water shutoff, and has been ordered plugged at 3404 feet. A location to the south has been staked.

The LaRue dome wildcat test in Henderson County of the Superior Oil Company (California) on the Faulk-Coleman 165-acre tract has been omitted after drilling through the Woodbine sand horizon to a depth of 3543 feet.

In Ellis County, the test of Carl Brooks and others on the Anderson tract, E. C. Branch survey, has been abandoned as a failure in Georgetown lime at 1050 feet after remaining inactive at that depth for some months.

Boiler Blew Up

In Anderson County, McAllister-Barclay et al's J. C. Beard (62-ac) 1, J. Trimmer survey, shut down after boiler blew up while preparing to run casing to test oil saturated Wilcox sand at 1475-1515 feet.

The Bowie County test of Roy E. Anderson and associates on the A. Y. Breckenridge 464-acre tract, M. Dykes survey, logged Pecan chalk at 1362-1805 feet, with surface elevation of 352 feet, is reaming hole in red shale at 2920 feet. Tom Bell, W. J. Dobbs and Fred S. O'Neil's Mrs. T. M. Moss (465-acre) 1, O. D. Watson survey, shut down after cementing surface casing at 104 feet.

In Cherokee County, Loring Oil Company's F. M. Swearingen (55-acre) 1, Oliver Lund survey, topped Pecan chalk at 3592 feet, with elevation of 387 feet, and Austin chalk at 4620 feet, and drilling below 4825 feet in chalk.

In Franklin County, White Oak Oil Company has made location in northwest corner of the O. C. Clanton land, S. McCreary survey.

The Henderson County test of McCormick and B. L. Green on the M. H. Gossett 103-acre tract, L. D. Stover survey, topped Austin chalk at 2347 feet and Woodbine sand at 3267 feet, with surface elevation of 341 feet, and is standing at 3328 feet. H. H. Myers et al's M. E. Olson (80-acre) 1, Geo. Wilson survey, logged Pecan chalk at 3070-3245 feet, with elevation of 512 feet, shut down with no show oil or gas, total depth 3722 feet in Taylor shale.

In Hill County, Grover & Rose's J. C. Nelson 1, C. Sullivan survey, is a machine. W. H. Mahon et al's T. F. McGuffey (200-acres) 1, A. Vaughan survey, is a location. T. J. Spikes et al's test on M. H. Davis 55-acres, J. R. Alexander survey, logged Austin chalk at 727-1030 feet, shut down at 1550 feet.

In Hopkins County, Burgess & Simpson's test on land of Mt. Vernon National Bank in M. E. & P. Ry. survey, has elevation of 385 feet, is idle at 1390 feet, pending completion of a new water line. Earl P. Corley and Jerry Hawkins' J. D. Jumper 1, Jas. Webb survey, is shut down at 1635 feet.

In Kaufman County, Elzey, Bentley and Brewer's J. B. Hunter 1, R. Sowell survey, is a derrick.

The Limestone County test of C. M. Joiner Petroleum Corporation and Miller Drilling Company on the W. Stephenson 54-acre tract, Geo. Gentry survey, topped Austin chalk at 3050 feet, remains idle at 3145 feet.

In Leon County, Shell Petroleum Corporation, J. R. Black and Penn Oil Company's test on the Wm. Phillips 164-acre tract, E. A. Swayze survey, logged Pecan chalk at 4135-4181 feet, and Austin chalk at 4841-5570 feet, with elevation of 423 feet, swabbed and flowed salt water in lower Woodbine at 6157 feet, and plugged back to 6100 feet to test upper sand at 6054-68 feet, and again tested water.

The Morris County test of Buchanan-Burkhalter and others on the Staggers 65-acre tract, Forbes & Nelson survey, has elevation of 370 feet, and reported hard chalk at 2526-3020 feet, and Austin chalk at 3483-3506 feet, plugged back from junked hole at 3672 feet to 3422 feet and re-drilling in new hole at 3465 feet. Grover Hart et al's Walcott-Lott (577-acre) 1, D. A. Russell survey, is shut down at 1550 feet.

In Red River County, Ajo Oil Corporation's test on the Nichols-Daniels 880-acre tract, Hugh B. Shaw survey, is a location. Concord Oil Company's J. R. Dellahunty 1, I. Moore survey, is idle at 2775 feet. L. G. Priest et al's test on the R. W. Peek 220-acre tract, Abram Wagley survey, is drilling at 1250 feet.

In Robertson County, C. A. Everts Drilling Company et al's test on the Cook tract, H. Henry survey, is moving in big rotary to deepen from 4200 to 6100 feet.

In Rusk County, W. T. Bodine and others' G. W. Hooper 1 on 20-acre lease, Juana de la Vina survey, logged Pecan chalk at 2620-2946 feet and first Austin chalk at 3424 feet, with surface elevation of 439 feet, and shut down at 3593 feet. Cranfill-Reynolds Company et al's W. J. Weatherby 1 on 512-acre tract, Wade J. Walters survey, has partly rigged up. Geo. F. Hudson et al's Jeff H. Phillips (148-acres) 1, N. Villeareal survey, is idle at 1500 feet.

In Smith County, Mundt and Mount's test on the Murray 65-acre tract, Marshall University survey, reported Pecan chalk at 3496-4000 feet, and base of Austin chalk at 4608 feet, with elevation of 579 feet, collapsed drill stem in making formation test in water sand at 4849-93 feet.

In Upshur County, F. A. Fuller-McMurphy & Kouns' test on the W. M. Shettlesworth 50-acre tract, Jas. M.

Dunn survey, has erected derrick. F. W. Maddox et al's D. A. Fleet 1, on one-acre tract, C. H. Cooper survey, reported first broken Pecan chalk at 2370 feet, and top hard chalk at 2430 feet, with elevation of 336 feet, shut down after testing salt water after plugging back from 3682 to 3676 feet. Newsom & Orr's D. J. Smith 1, J. R. Davis survey, is idle at 1925 feet. Tucker & Van Fleck's test on the Dr. H. J. Childress 143.8-acre tract, J. H. Gilder survey, is logging shale while drilling at 3615 feet. J. K. Wadley-C. H. Lyons and J. P. Evans' H. E. Hall (14-acres) 1, W. H. McKee survey, logged Pecan chalk at 2450-2966 feet, is drilling at 3460 feet in shaley-shells, with elevation of 287 feet.

In Van Zandt County, J. Alvin Gardner and C. Ling's deep test on the J. Leonard 53½-acre tract, Phillip Mason survey, topped Woodbine sand about 4240 feet, and Georgetown lime at 4950 feet, with elevation of 511 feet, has resumed drilling at 5760 feet. Kellum and Chisum's J. J. Goode 1, David Rose survey, has surface elevation of 492.7 feet, and has erected a derrick. H. W. Peden et al's test on the W. S. Brannon 45-acre tract, J. Goodman survey, is partly rigged up. H. C. Teague's (was H. Harper and W. A. Phillips) C. W. Morris 160-acre 1, C. L. Morrison survey, with an elevation of 490 feet, is to deepen from 3097 feet.

In Wood County, DeGenther and F. H. Zeigen's test on the M. L. McLain 66-acre tract, Sam Brooks survey, logged Pecan chalk at 2553-2740 feet, with elevation of 455 feet, and is standing at 3850 feet. Hull and Sharp's T. H. Peterson 1, (320-acre) W. B. McNutt survey, is shut down at 2815 feet.

East Texas Completions Drop to 58 for Week

Tyler, Texas. — Completions in the East Texas oil field decreased last week to the lowest level of the year in registering a total of 58, as compared to 77 final reports for the previous week. Adverse weather conditions, short week because of holiday observance and natural slowdown of field activity worked together in establishing the low mark. There were no dry holes, although several completions hardly qualified as commercial pumpers.

Continuation of a fairly active drilling program in the field is largely contingent upon the method of proration imposed upon the field when it is restored to production on or about January 1.

A list of completions follows:

Joiner Area

Company, Well and Location	Initial Production Bbls.	Depth
American-Liberty Oil Co., L. J. Pinkston (86-ac) 7-A	7500	3664
British-American Oil Prod. Co., Murphy (40-ac) 5	8400	3661
Jim Cloud, Inc., W. F. Neal-Shell (109-ac) 8	9000	3790
Devonian Oil Co., W. O. Alford (99-ac) 7	6000	3794
W. H. Gant & Garvin, W. P. Moore (134-ac) 8	3000	3751
Gulf Prod. Co., Ida Holt (69-ac) 8-B	6500	3784
J. W. Shaw (89-ac) 8	8500	3729
John W. Hooser (H. W. Whisenant, Rec.) Eaton (21½-ac) 6-B	9000	3758
Humble O&R Co., D. C. Joyner (74.11-ac) 4	8000	3732
W. L. Price (466-ac) 27	9500	3773
Heywood White (134-ac) 4-B	7500	3779
J. H. Wooley (201.53-ac) 11	8400	3661
Sherman Hunt & Landrum, W. H. Frederick (12-ac) 1	325	3690
Mebane Oil Co., D. M. Bradford 1	1500	3624
Mid-Kansas O&G Co., M. C. DeGuerin (158-ac) 10	3000	3661
W. T. Grissom (842-ac) 27	6000	3679
W. T. Grissom (842-ac) 35	8000	3668
S. H. Moores (193-ac) 12	8500	3684
J. H. Sharpe (482.67-ac) 18	4500	3691
Stanolind O&G Co., J. W. Ashby (107-ac) 1	25	3809
Stanolind-Pure Oil Co., W. H. Siler (949.6-ac) 39	1500	3641
Humble O&R Co., S. S. Laird (568-ac) 26-B	375	3611
F. P. & H. P. Hynes (was Lambert & Hynes), D. Beall (12-ac) 3	11,000	3605
Sun Oil Co., Hodnett-Melton (176½-ac) 2	7000	3718
The Texas Co., W. W. Henry (229-ac) 12	5500	3660

Kilgore Area

Company, Well and Location	Initial Production Bbls.	Depth
Atlantic Oil Prod. Co., Clayton 6-B	9000	3580
Blue Star Oil Co., Sabine River 7-H, Tr. No. 7	9600	3500
Central Commercial Oil Co., King-Shell (133-ac) 5	6000	3712
Invincible Oil Co., Weiss (66-ac) 6	9500	3553
W. I. LeMaster et al, Mrs. F. Thompson (Blk. 51) 2	2500	3620
Lucey Pet. Co., D. Gill (38-ac) 3	9000	3735
E. J. Raddatz et al, M. T. Cole (5-ac) 3	12,000	3547
Rhoads Drlg. Co., Sabine River 9, Tr. No. 4	8000	3554
Sam P. Shelburne et al, Crim Mercantile-Gulf (70-ac) 4	3000	3679
Shell Pet. Corp., M. H. Bivins (113-ac) 8-A	9200	3592
M. H. Bivins (113-ac) 9-A	9500	3613
Rosa Russell (126-ac) 12	8500	3721
J. Ben Watson (285-ac) 27	10,000	3593
J. Ben Watson (285-ac) 28	11,000	3591
J. Ben Watson (285-ac) 29	8500	3622
Simplex Oil Co., J. E. Lawther (35-ac) 3	1500	3577
H. R. Smith, Inc.-Hardesty & Buckner, J. S. Bean (11-ac) 2	10,000	3700
Sun Oil Co.-Texas Seaboard Oil Co., E. S. Smith (53.3-ac) 3	9800	3635
Trapshooter Reilly Oil & Roy. Corp., E. Mitchell (15-ac) 5	9500	3604
Westheimer & Daube, W. P. Brightwell (18-ac) 3	11,000	3601

Longview Area

Company, Well and Location	Initial Production Bbls.	Depth
Amerada Pet. Corp., M. Killingsworth (100-ac) 9	10,000	3585
Atlantic Oil Prod. Co., J. M. Moore (456-ac) 33	10,500	3535
Bonds-Dillard Drlg. Co. (was Hamill-Smith) D. M. Meyers (40-ac) 3	9000	3567
Tom J. Carter et al, Geo. Anderson (9-ac) 2	9600	3515
Humble O&R Co., A. L. Shelton (29-ac) 3	3500	3703
T. D. Humphreys et al, F. P. Branson (24-ac) 3	80	3630
Rajo Oil Corp., J. C. Barrett (80-ac) 3	7000	3658
Refugio Oil Corp.-J. Z. Werby, Gen. H. Read-Shell (196-ac) 2	7200	3628
Shell Pet. Corp., W. T. Burnside (160-ac) 14	8500	3547
Howard Hampton (169-ac) 9	9500	3691
C. C. Slaton (100-ac) 10	12,000	3665
Superior Oil Co., H. Pritchard (100-ac) 12-A	11,000	3558
W. F. Turner et al, Alford Jones (63-ac) 6	10,500	3683

Texas Permits Make Low For Year During Holidays

Austin, Texas.—Permits to drill in Texas issued during the week totaled only 49, the smallest total of the year for any one week. This number, however, was enough to bring the state's total for 1932 up to 7029 permits, representing a gain of 48 permits over the number granted in 1931, or an average gain of four new wells per month.

Gregg and Rusk Counties in East Texas and Montgomery County in the Gulf Coast required most of the new permits; 19 going to Gregg County; six to Rusk County; and six to Montgomery County.

In Archer County, L. W. Fritz, Wichita Falls, was granted a permit to drill Werckwotsch 1, (121-ac), in the J. W. Harris survey 150 feet from the south and west lines of Block 20.

In Bexar County, Eckert & Son, San Antonio, were granted permit to drill A. C. Brehm 1, (85-acres), No. 58 P. L. Buquor survey, 150 feet from south and east lines.

In Brown County, Christie & Cunningham, Rising Star, were granted permit to drill Kilgore 3, (80-acres), H. McClure survey, 450 feet north of No. 2. Green & Ice, Brownwood, were granted permit to drill J. Byler 6, (44-acres), No. 43 T&NO survey, 400 feet northeast of No. 2.

In Chambers County, Mills Bennett Production Company, Houston, was granted permit to drill E. H. Fisher 1, (64-acres), Wm. Bloodgood survey, 150 feet north of Gulf No. 1.

In Duval County, E. M. Jones of San Antonio was granted permit to drill Duval Ranch A1, (40-acres), Section 278, GC&SF survey, 62 feet from east and 144 feet from south line SE NE.

In Fort Bend County, Gulf Production Company, Houston, was granted permit to drill T. R. Booth 5, (452-acres), Jno. Rabb survey, 456 feet from south and 5196 feet from west line.

In Gregg County, Edwin Lacy of Longview was granted permit to drill Fee 1, (1½-acres), M. Van Winkle survey, 146 feet from east and 114 feet from south line. H. W. McGee of Mt. Vernon was granted permit to drill M. O. Shepperd 2, (31-acres), G. R. Rains survey, 330 feet from east and 108 feet from south line. Delta Drilling Company, Longview, was granted permit to drill Hughey-Ross 4, (21-acres), Jas. Hilliard survey, 330 feet from south and east lines. Everts Drilling Company, Dallas, was granted permit to drill O. Cook 2, (16½-acres) G. F. Penn survey, 330 feet from north and 235 feet from west line. Stroube & Stroube, Corsicana, were granted permit to drill J. R. Beall 3, (28-acres), M. Van Winkle survey, 181 feet from east and 340 feet from southeast corner of lease. Mullendore, Berry & Berry, Kilgore, were granted permit to drill Barnwell 2, (11-acres), A. McAnelly survey, 225 feet from west and 110 feet from south line. J. B. Hughes, Bloomington, Illinois, was granted permit to drill A. A. King 2, (9-acres), M. Tenison survey, 234 feet from north and 108 feet from west line. Lucey Petroleum Corporation, Longview, was granted permit to drill B. F. Maxwell 8, (87-acres), E. Collard survey, 161 feet from north and 330 feet from east line. Faith Oil Corporation, Wichita Falls, was granted permit to drill J. C. Barrett 4, (140-acres), B. W. Witcher survey, 775 feet from north and 330 feet from west line. Atlantic Oil Producing Company, Dallas, was granted permit to drill W. P. Duncan 13, (155-acres), Ferguson survey, 330 feet from west and 183 feet from south line. Gulf Producion Company, Houston, was granted permit to drill M. F. Barker 6, (74-acres), M. Dillard survey, 193 feet from north and 939 feet from west line; J. C. Judge 33, (518-acres) F. W. Johnson survey, 330 feet from south and 512 feet from west line; W. B. Goyne 4, (30-acres) J. T. McDaniel survey, 195 feet from north and 291 feet from east line; T. C. Reeves, 8, (80-acres), G. F. Penn survey, 25 feet from north and 78 feet from east line. Sinclair Prairie Oil Company, Fort Worth, was granted permit to drill King B 3, (50-acres) M. McCurry survey, 875 feet from north and 330 feet from west line. Shell Petroleum Corporation, Dallas, was granted permit to drill A. N. King 12, (160-acres), G. A. Thomason survey, 600 feet west of No. 1. Tidal Oil Company, Kilgore, was granted permit to drill J. S. King 12, (80-acres), M. Van Winkle survey, 330 feet from north and 545 feet from west line. Sun Oil Company, Dallas, was granted permit to drill A. G. Morton 1, (336-acres) S. Baggett survey, 1200 feet from north and 307 feet from west line. Yount-Lee Oil Company, Beaumont, was granted permit to drill A. McCrary 5, (65-acres), W. H. Castleberry survey, 246 feet from east and 81 feet from south line.

In Galveston County, Yount-Lee Oil Company, Beaumont, was granted permit to drill G. E. Smith 14, (200-acres), M. Dunman survey, 1773 feet from north and 925 feet from west line.

In Jones County, J. Kingsberry, Ft. Worth, was granted permit to drill W. D. Swann 2, (163-acres), Section 281, I. Miley survey, 320 feet from north and 200 feet from west line.

In Liberty County, Republic Production Company, Houston, was granted permit to drill Dolbear 148, (800-acres), J. Devore survey, 200 feet northwest of No. 147. D. L. Thibedeaux, Daisetta, was granted permit to drill H. Taylor

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2, (10-acres), J. Devore survey, 50 feet north of No. 1.

In Loving County, A. & M. Petroleum Company, El Paso, was granted permit to drill M. Howard 1, (80-acres) Section 71, Block 1, W&NW survey, 2970 feet from northeast and 990 feet from southeast line of section.

In Montgomery County, The Texas Company, Houston, was granted permit to drill E. Moody 15, (473-acres), Ransom House survey, 966 feet north of No. 14. Continental Oil Company, Fort Worth, was granted permit to drill Rock Creek Lumber 1, (160-acres), Jno. Foster survey, 1280 feet from north and 1320 feet from east line. H. H. Thompson, Houston, was granted permit to drill Jno. Rhoden 1, (3-acres), Ransom House survey, center. Humble Oil & Refining Company, Houston, was granted permit to drill Mrs. L. Wiggins 1, (23-acres), L. Smith survey, 466 feet from north and west lines; A. A. Madeley 12, (763-acres) Ransom House survey, 800 feet from north and 1310 feet from west line; 13, 1100 feet southeast of No. 6; Mrs. H. N. Moore 4, (989-acres), L. Smith survey, 933 feet northeast of No. 2.

In Orange County, The Texas Company, Houston, was granted permit to drill Stark 4, (1240-acres), M. Beauchamp survey, 675 feet from west and 340 feet from south line.

In Rusk County, Droppleman Drilling Company, Tyler, was granted permit to drill F. J. Cox 3, (24-acres) Bears-Darley survey, 250 feet from west and 160 feet from south line. Humble Oil & Refining Company, Houston, was granted permit to drill J. H. Wooley 15, (201-acres), F. Cordova survey, 1221 feet from north and 330 feet from west line. Gulf Production Company, Houston, was granted permit to drill I. Holt B 9, (69-acres), Geo. Berry survey, 606 feet from north and 330 feet from west line; W. L. Murphey 7, (79-acres), F. Cordova survey, 334 feet from west and 355 feet from south line. Sun Oil Company, Dallas, was granted permit to drill R. J. Hendon 5, (120-acres), J. Ximinez survey, 330 feet from north and east lines. Stanolind Oil & Gas Company, Ft. Worth, was granted permit to drill R. A. Moores 19, (47-acres), J. B. Cadena survey, 78 feet from north and 330 feet from west line.

In Smith County, Humble Oil & Refining Company was granted permit to drill M. C. Thompson 8, (110-acres), I. Moore survey, 1175 feet from west and 330 feet from south line. Shell Petroleum Company, Dallas, was granted permit to drill Mayfield 9, (197-acres), Jas. Jordan survey, 500 feet east of No. 2.

In Webb County, D. R. Semmes, San Antonio, was granted permit to drill Duval Ranch 1, (80-acres), L 22, ZCSL Survey No. 3, 150 feet from south and 1950 feet from east line; 2, L 21, 150 feet from south and 2250 feet from east line.

Eight Producers Added In West Texas Fields

San Angelo, Texas.—The West Texas district added eight oil producing completions during the past week, with five counties contributing. These wells accounted for an aggregate of 2928 barrels of new production.

The largest well was Shell Petroleum Corporation's J. J. Phillips 2, Glasscock County, making 1500 barrels on a brief pumping gauge from lime at 2246-2360 feet. Gulf Production Company's Crier-McElroy 10 made a flush flow of 940 barrels of oil, testing 31° gravity at 45° temperature, after a shot of 350 quarts in lime at 2785-2917 feet to give Crane County its first big well in some months.

A tabulation of West Texas completions for the week follows:

Company, Well and Location	Initial Production Bbls.	Depth
Crane County—		
Gulf Prod. Co., Crier-McElroy 10	940	2922
Fisher County—		
The Texas Co., Dan W. Stephens 3-B	250	3231
Glasscock County—		
Shell Pet. Corp., J. J. Phillips 2	1500	2360
Garza County—		
M. L. Richards et al, W. E. Connell 1	18	2948
Ward County—		
Atlantic Oil Prod. Co., T. H. Barrow 2	20	2566
Gulf Prod. Co., G. W. O'Brien 24	65	2675
Texas Pacific Coal & Oil Co., Henry James 5	70	2400
Henry James 6	65	2430

New Jones County Field Opened By 200-Barrel Well

San Angelo, Texas.—A new oil pool for southeastern Jones County has been established by Condor Petroleum Company's wildcat test on the Henry Sayles land, located about five miles southeast of Hawley, with a natural flow rated at 200 barrels daily at a total depth of 1915 feet. The oil tests about 37 gravity, and is free of sulphur. Sayles 1 has drilled only about one foot in the sand. A string of 8¼-inch pipe has been set on bottom, with the last 24 feet perforated in lieu of a liner. An actual gauge credited the well with flowing 150 barrels of oil in 15 hours via 200 feet of cavings accumulated while running pipe. It is located 650 feet south and 300 feet east of the northwest corner of Lot 3, Block 20, T&P Ry. survey. The producer has a surface elevation of 1940 feet.

Presence of a potential oil producing area on the Sayles land was indicated in June, 1928, when Teas-Wheeler et al's Sayles 1, located in the northeast part of Lot 3, and due east of the above wildcat producer, logged oil saturated sand at 2070-76 feet, with a surface elevation of 1648 feet. However, it was later drilled into water and abandoned at 2413 feet.

Four Dry Holes and One Pumper in North Texas

Wichita Falls, Texas.—A single oil producer, represented by a 20 barrel pumper, was included in the five completions credited to the North Texas district last week. The four dry holes were scattered among a quartet of counties, with Young County failing to score a completion for the first time in many months.

A list of completions follows:

Company, Well and Location	Initial Production Bbls.	Depth
Archer County—		
Carter, Dean & Alexander, Arnold 2	20	1186
Floyd Miller et al, McMurtry 1	*	803
Clay County—		
White-Duncan et al, Boyd 1	*	901
Jack County—		
A. C. Parks et al, Webb 1..	*	770
Wichita County—		
E. J. Stump et al, Barton 3	*	1756

Gray County Extension Well Makes 28 Barrels Per Hour

Pampa, Texas.—An eight-hour flowing gauge given Mazda Oil Corporation's Coombs-Worley 3, a north extension well to the Finley-Brown-Wright area, Gray County, early last week averaged 28 barrels of pipe line oil hourly. This well began flowing in granite wash formation at 2976-80 feet, with a big increase at 3022-30 feet that amounted to 40 barrels per hour for a brief period. It now has a total depth of 3044 feet, or about 14 feet below sea level. This completion is in the NWc NE Section 35, Block 3, I&GN Ry. survey, and will require a trio of offsets from as many companies.

Multiplicity of Sands *Gives Interest and Importance to* South Texas

RICHARD L. MANNEN, ***Geologist,*** **and**
EARL S. POST, ***Staff Representative***

MULTIPLICITY of sands, high recovery and potential production as deep as the drill will go, together with dozens of major oil and gas discoveries during the past three years, makes the South Texas Gulf Coast Region an important factor in the nation's oil reserve.

This particular district is limited in area, embracing a section about 115 miles long and hardly more than 50 miles wide, extending south and southwest along the Gulf of Mexico from the Edna gas field in Jackson County to the edge of Kleberg County in which the Kingsville field is locaed.

This section is on a high, which is nosed above the Coastal salt dome plane, hence it gains its name of the "Trans-Salt Dome Region." To the northeast is the prolific salt dome producing area, where a heavy development campaign is now underway. To the southwest, however, the prospecting for salt domes has not been active, although a few important domes have been uncovered. The sector between two salt dome areas, described above, is now receiving its greatest play, the result being most profitable.

This particular district, including portions of Jackson, Victoria, Refugio, Goliad, Aransas, San Patricio, Live Oak, Jim Wells and Nueces Counties, is not at all new to the operator inasmuch as its shallow gas horizons were opened during the earlier days of South Texas oil development. Also, it gained wide publicity to the general public by spectacular gas wells running wild, cratering, turning into small volcanoes by catching afire and burning for months.

Refugio field, Refugio County, was the first oil field to be discovered in this area, that being on July 28, 1928. This field's recovery has been an incentive for the wildcatter or developer in this section of the coast. It not only indicates the possibilities of production at many depths, but suggests large areas of production and a market for the oil produced.

Practically all of the oil produced comes from the Oligocene and Miocene series of the Tertiary, but there is some oil from the Claiborne and Cockfield, with possibilities deeper. The accumulation of oil and gas in most cases is effected by faulting and folding, rather than highs as a result of salt domes.

The greater part of the production so far discovered in this district is controlled by a few companies holding large blocks, thus materially reducing drilling at this time. These companies, as well as numerous independents, however, are spending much of their time in exploration work. This has been especially noted since the latter part of 1931.

Geophysical work has proceeded almost unabated. Gulf Production Company maintained two torsion balance crews, mainly in Jackson County, for months. Humble Oil & Refining Company has maintained a party doing reflection method seismograph work in Victoria, Refugio, Nueces and Jackson Counties and also has torsion balance crews surveying parts of the same counties. Stanolind Oil & Gas Company, one of South Texas' most successful wildcatters, made reflection method surveys of Kleberg, Nueces, San Patricio and Jim Wells Counties. Atlantic Oil Producing Company and Shell Petroleum Corporation also are doing work.

For actual field development, the Saxet district near Corpus Christi, in Nueces County, is in the lead, but Victoria-Refugio wildcatting holds probably the greatest interest in as much as deep prospects are uncovering showings of importance. A glance at the logs from some of these wildcats, showing solid sand bodies up to 400 feet are most interesting. Many of them show high gas pressure, little oil, or salt water at close intervals from the grass roots to their total depth, indicating some sort of production in nearly every well started.

An indication of the sand conditions through this area is best illustrated by tests made in one of Refugio's shallowest oil producers, Larcro Gas & Pe-

Oil Production of South Texas Trans-Salt Dome Region

Field	1928	1929	1930	1931	Dec. 1, 1932	Recovery to Date
Agua Dulce	Gas	Gas	800	18,341	13,600	32,741
Armagosa	.....	.....	Gas	Gas	Gas	Gas
Gulf-O'Conner	.....	.....	.....	.....	Gas	Gas
Keeran	.....	.....	.....	.....	Gas—Oil	Shut-in
King	.....	.....	.....	.....	Gas	Gas
Kingsville	152,567	119,610	38,748	40,469	Abandoned	351,394
Lucas	Gas	Gas	Gas	12,675	8,582	21,257
McFadden-O'Conner	.....	.....	Gas	Gas	1,000*	1,000
Refugio	61,258	1,992,954	11,447,473	9,488,123	4,403,216	27,393,024
Sandia	.....	.....	Gas	Gas	Gas	Gas
Saxet	Gas	Gas	9,370	151,490	321,994	482,854
Stratton	.....	.....	.....	.....	Gas	Gas
Welder	.....	.....	.....	Gas	Gas	Gas
White Point	Gas	Gas	1,080	14,368	9,983	25,431
Totals	213,825	2,112,564	11,497,471	9,725,466	4,758,375	28,307,701

*Producer drilled deeper.

troleum Company's Strauch 1, which is as follows:

Surface.	Lissie.		
1123-1170,	sand,	gas,	400 lbs. pressure
1400-1435,	sand,	gas,	550 lbs. pressure
1560-1570,	sand,	gas,	773 lbs. pressure
1625-1645,	sand,	gas,	650 lbs. pressure
1670-1690,	sand,	gas,	650 lbs. pressure
1730-1740,	sand,	gas,	730 lbs. pressure
1820-1835,	sand,	gas,	635 lbs. pressure
1850-1870,	sand,	gas,	725 lbs. pressure
1900-1915,	sand,	gas,	765 lbs. pressure
2020-2030,	sand,	gas,	790 lbs. pressure
2080-2103,	sand,	gas,	810 lbs. pressure
2230-2262,	sand,	gas,	700 lbs. pressure
2320-2340,	sand,	gas,	810 lbs. pressure
2380-2410,	sand,	gas,	1100 lbs. pressure
2470-2490,	sand,	gas,	825 lbs. pressure
2834-2870,	sand,	gas,	1125 lbs. pressure
3210-3220,	sand,	gas,	1490 lbs. pressure
3260-3270,	sand,	gas,	1300 lbs. pressure
3300-3317,	sand,	gas,	1325 lbs. pressure
3450-3470,	sand,	gas,	1500 lbs. pressure
3500-3530,	sand,	gas and oil,	1450 lbs. pressure
3570-3578,	sand,	gas,	1655 lbs. pressure
3689-3720,	sand,	gas and oil,	completed as oil well.

This well is producing from the first oil horizon in the Refugio field. There are other commercial wells to 6600 feet in about a dozen horizons and possibilities have been made more or less certain in several more sands to below 9000 feet. As will be remembered, Edwin M. Jones got a sand at 9098-9131 feet in Josephine Mitchell 1-B, Refugio, early in the year and ran a string of 5 3/16-inch pipe with 100 feet of screen to the bottom of the hole. The well tested oil, gas and water but could not be fully completed as a producer.

To December 1, 1932, Refugio had produced 27,393,024 barrels of light and heavy oil since its discovery by Texas Gas Company's Clint Heard 1, which was an unsuccessful gas well at the regular horizon and was deepened to 3628-3702 feet, where it flowed 700 barrels of 26 gravity oil on July 28, 1928.

The major deep sand discoveries were made as follows:

September 26, 1929, Mission Drilling Company's O'Brien 1, one mile east of production, came in from 5525 feet as a large gasser spraying about 30 barrels of 32 gravity oil.

February 25, 1930, Houston Gulf Gas Company's M. F. Lambert 1, two miles northeast of the O'Brien producer, came in flowing 350 barrels daily at 5879-84 feet through 3/16-inch choke and showing 700 pounds pressure. It gradually increased to 1500 barrels of 30.9 gravity oil daily.

April 1, 1930, Union Producing Company's Rose Lambert 1 came in from 6456-68 feet as a gasser spraying a quantity of 42 gravity oil. It later turned to water but further drilling proved up the sand.

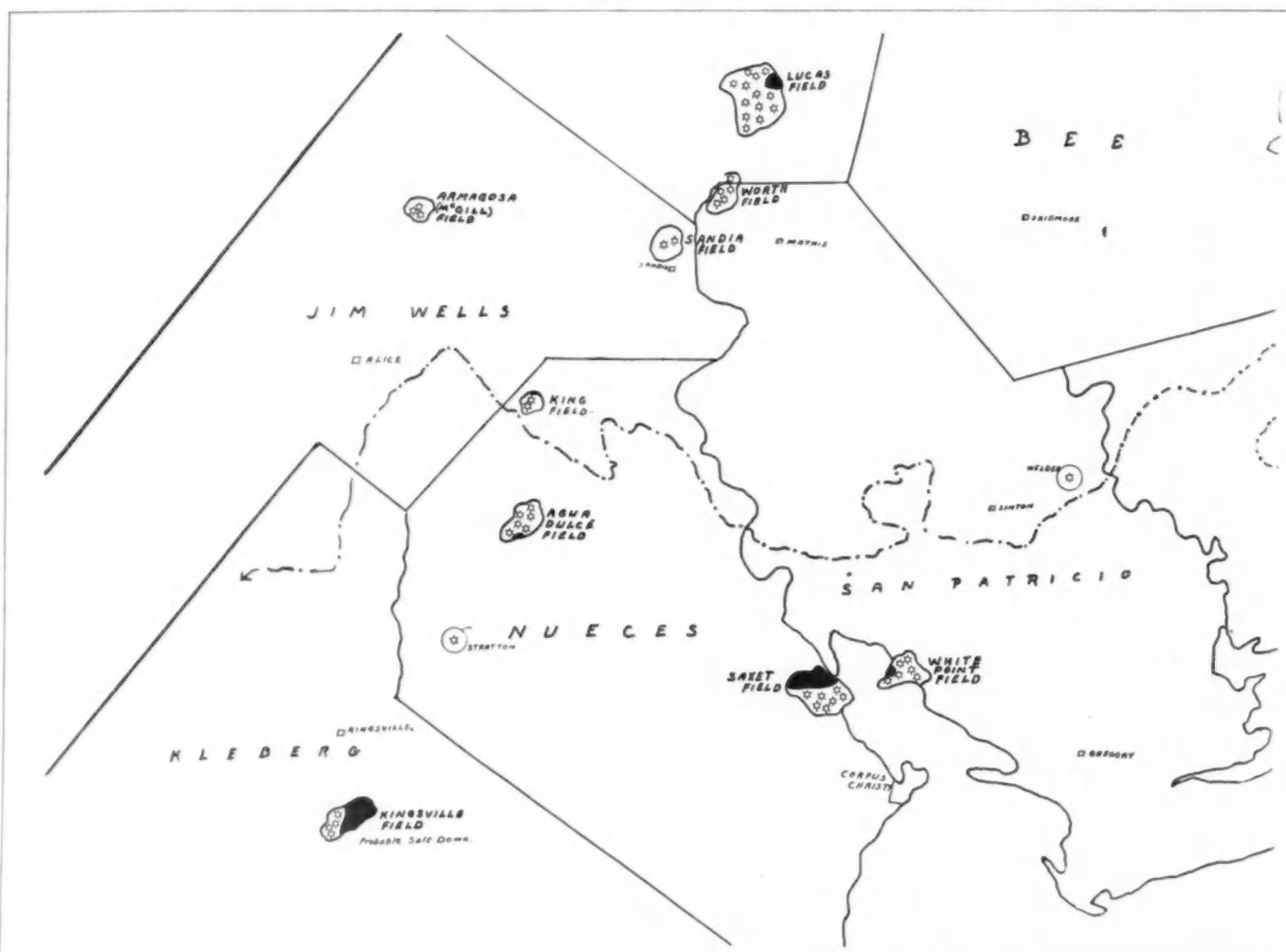
Refugio activity was at its greatest immediately following the various producing horizons, but the last year has seen a decided decline, undoubtedly accounted for by the condition of the oil market. A table of completions is the best illustration.

Refugio Well Completions

Year	Dry	Gas Wells	Oil Wells
1930	23	5	146
1931	16	4	48
1932*	2	1	8

*To December 1.

On December 1, 1932, two wells were



Map Showing Location of Producing Fields

listed as shut down for orders, but really on the active list. Not counting these two wells, 469 wells have been completed in the field to date. The status of the wells on December 1, 1932, was as follows: 148 producing oil wells; 35 producing gas wells; 286 abandoned oil and gas wells and dry holes.

The Refugio field first came into prominence in September, 1920, when Texas Gulf Gas Association brought in a large gasser, F. V. W. Heard 1, at 1902 feet. The gas development was the forerunner of the oil development in the field. Incidentally, no discovery of oil has been made in the district under consideration, except where gas has been discovered and developed at a shallower level.

An important discovery in the immediate vicinity of Refugio was the Fox area (North Refugio) in April, 1931, by United Production Corporation. This sand, at 5880 feet, although only partly developed, is proving unusually prolific, and is an indication of more pools to be discovered on the flanks of the large gas structure.

The surface formation of the field is an inlier of Lissie sand and gravel surrounded by the Beaumont Clay formation, indicating an uplift. On subsurface contouring of the 3700-foot sand a large dome is obtained with minor highs and saddles existing on the major structure. The 5400-foot sand and the deeper sands seem to be limited to the Refugio townsite property and so far they have not been productive in the north and west sides of the field. This field is purely anticlinal and has not been affected by faulting.

Saxet Field

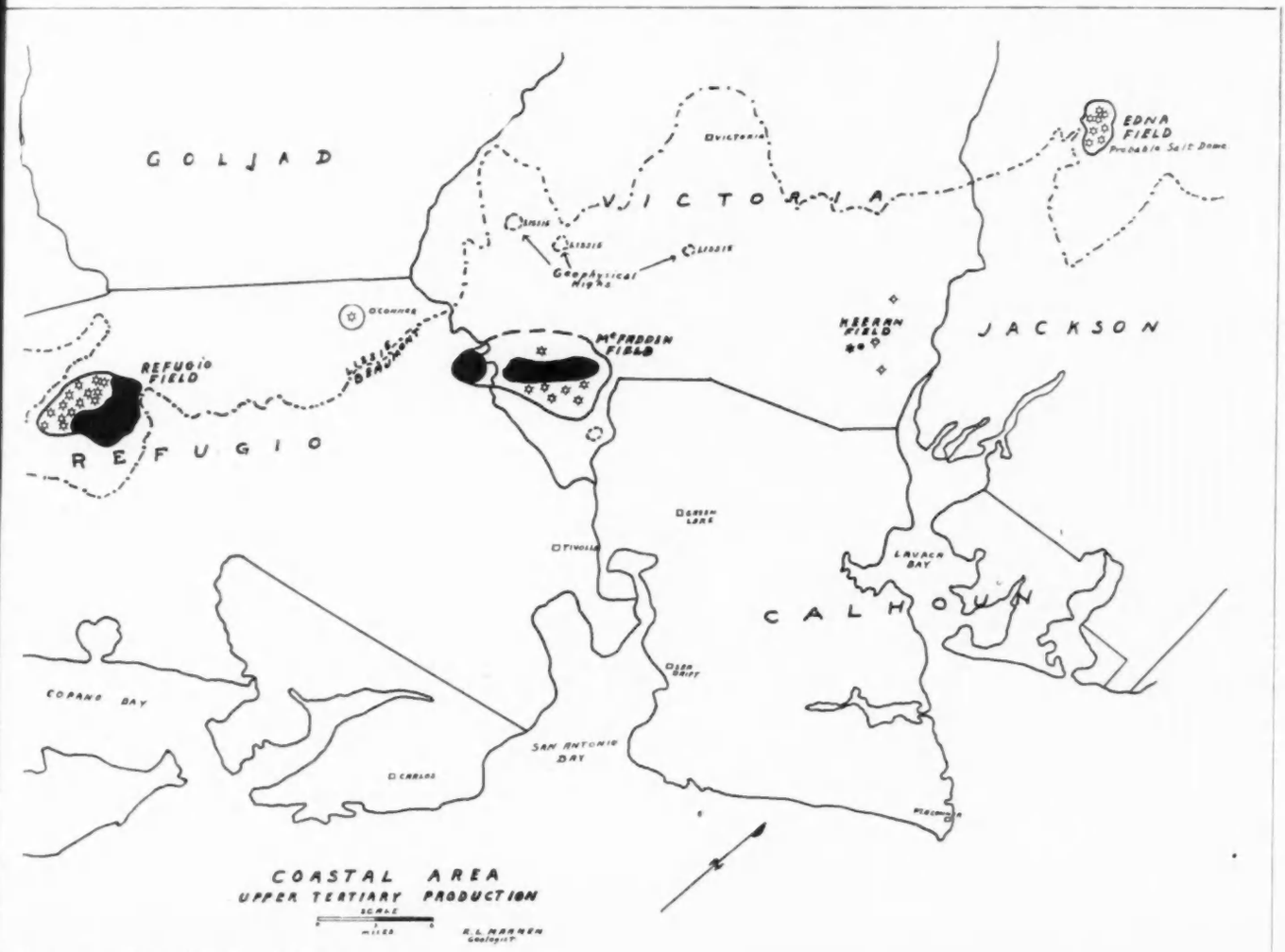
Saxet field, Nueces County, is attaining the proportions of Refugio from the standpoint of size and production. While the field was discovered several years ago, oil did not make its appearance until August 22, 1930, when Saxet Oil Company's Dunn 6 was completed at 4290-4304 feet for 120 barrels of 25 gravity oil and considerable salt water. The well showed a heavy gas pressure. Since, oil sands have been found both above and below this level. At present, Gulf Coast Oil Company is drilling a well headed for 8000 feet to test the lower levels. It is structurally high as it has shown a number of heavy gas sands. The field, producing around 3000 barrels of oil daily, is just starting its development campaign, the major activity around the new 4500-foot horizon.

From the gas standpoint alone, Saxet field is of great importance, its withdrawals being around 1,000,000,000 cubic feet monthly from 24 wells.

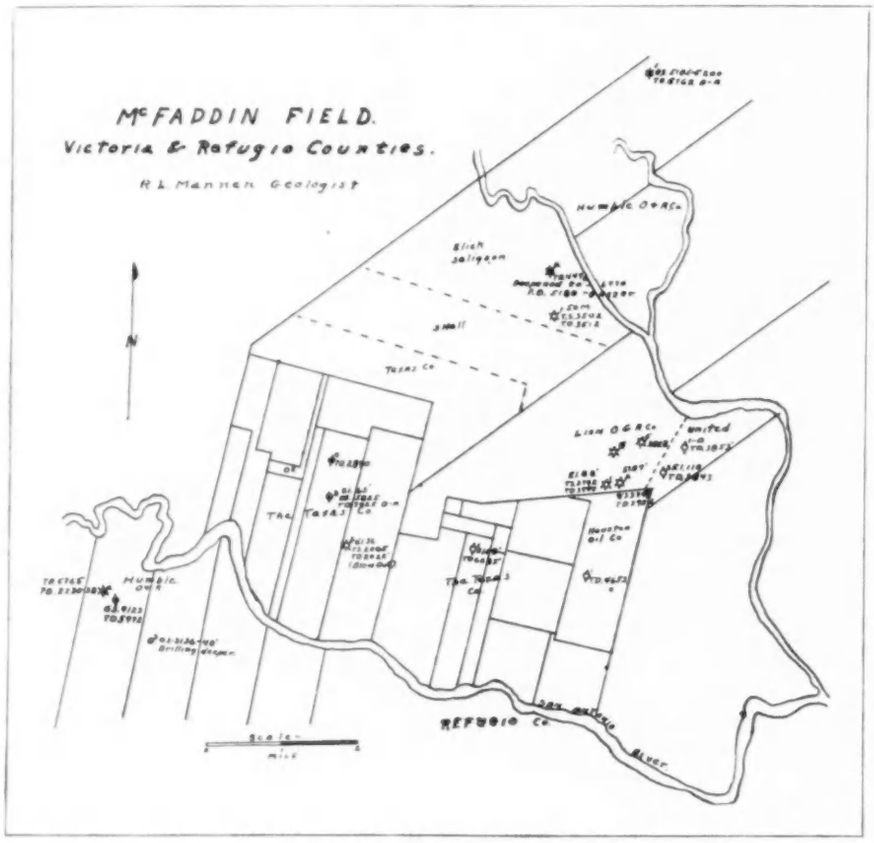
McFadden-O'Conner Area

McFadden-O'Conner area of Refugio and Victoria counties, with a limited number of wells drilled, has a producing area seven miles long and four miles wide and its limits not definitely established in any direction. What is more, there are producing horizons, around a dozen, already opened from 2000 to 6500 feet.

This district is an excellent bet for production at most any level as the entire eocene and oligocene series are yet to be explored and these series have proven very prolific through the Gulf Coastal area. The exact type of



in Lower Coast Region of Texas



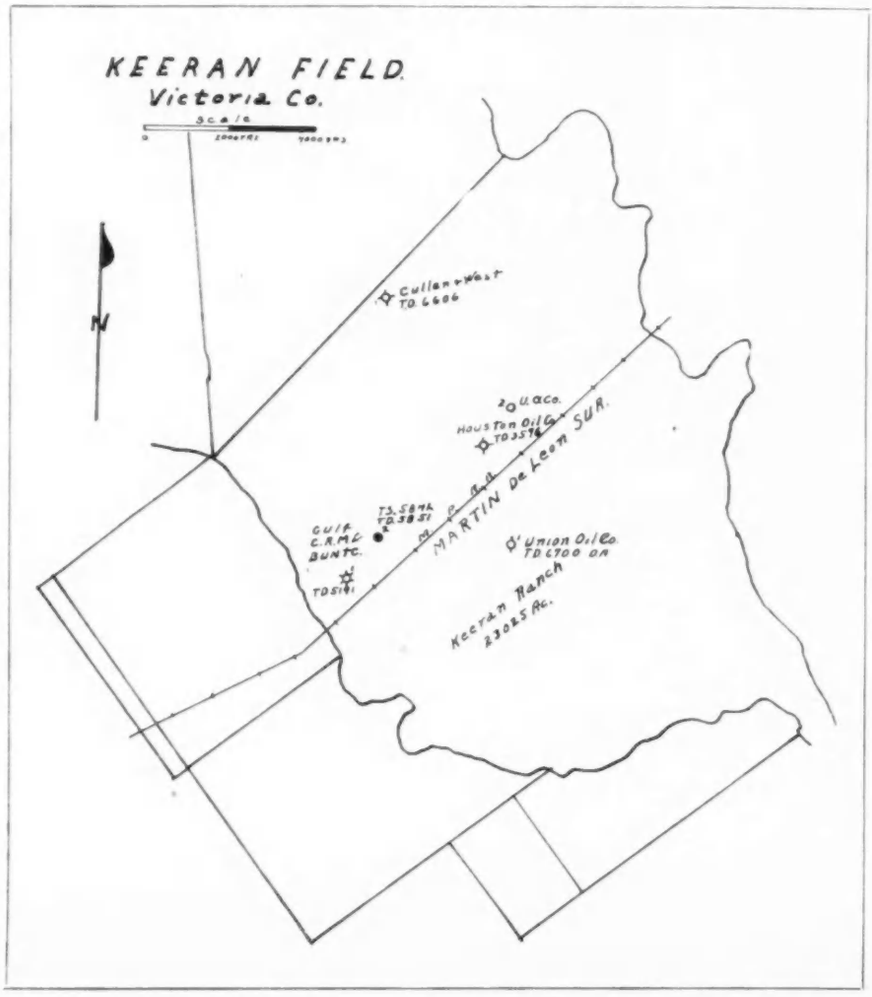
three fourths of a mile northwest of this well, showed a number of sands, namely: 3010-16, gas; 3281-87, gas; 3435-39, gas; 3540-44, gas and salt water; all in the Oakville formation of the Miocene age. In the Catahoula and Frio formations of the Oligocene age, the following sands were encountered: 3885-93, gas; 3901-67, gas; 4112-22, gas; 4850-55, gas; 5825-35, oil. It was completed in the latter sand on January 1, 1932, as a 600-barrel oil well, but recently declined to practically nothing and deepened to 7000 feet, where it was abandoned. Slick-Seeligson's McFadden 1 made a gasser at 3502-12 feet, and McFadden 2 made an oil and gas well at 4485-96 feet, but deepened to below 6000 feet. It has been plugged back to 5180 feet, where it is now being completed as a gasser. All of these wells are in Victoria County.

In the Refugio County portion of the field, just across the San Antonio River, Humble Oil & Refining Company has drilled three wells on the M. V. O'Conner tract. The first made an oil producer on December 1, 1931, from 4123-55 feet, but did not hold up and was deepened, then temporarily abandoned. The second well drilled to about 5800 feet, then plugged back to a 2300-foot

structural condition is unknown but it probably will look very similar to Refugio, being a large domal proposition with local highs on the major structure. The axis of the present field runs in a northeast southwest direction.

Victoria County's play has been most recent. During 1929 and 1930, Humble Oil & Refining Company, Shell Petroleum Corporation, Pure Oil Company, and The Texas Company worked seismograph and torsion balance on the area. I. K. Howeth took a block of 5000 acres in this immediate area, which apparently had a Lissie high surrounded by Beaumont. It was later sold to Lion Oil Refining Company, which on June 27, 1930, completed a large gasser at 3742-49 feet, showing 1750 pounds pressure. The top of the sand also was the top of the Marine Oligocene, thus placing it in the same geological column with the Refugio field. Eight gas wells and four oil wells have been completed in the field, but several other wells that showed sufficient to make large gassers have been drilled deeper and abandoned. Lion Oil Refining Company, Slick-Seeligson, Incorporated, The Texas Company, United Production Corporation and Humble Oil & Refining Company have the situation tied up and are conservative in their work.

The Texas Company's McFadden 2, completed February 15, 1931, when it threatened to blow-out, made a large gasser from 2025 feet. McFadden 3,



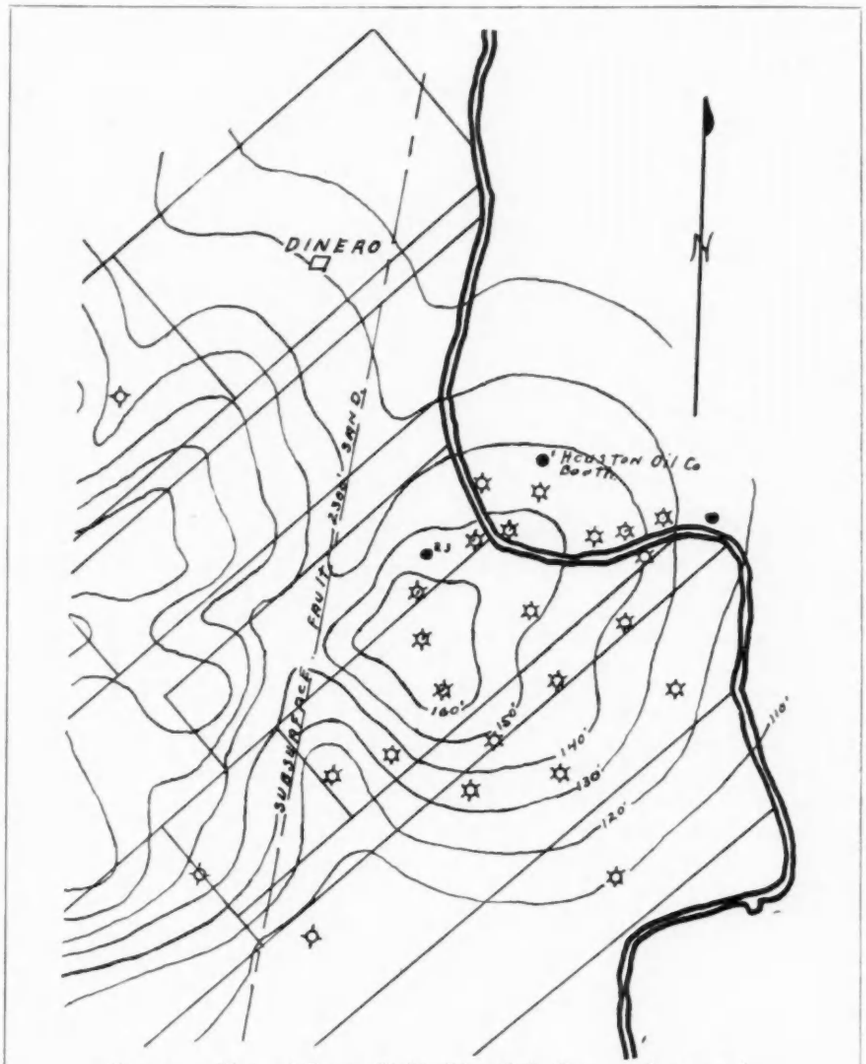
gas horizon, where it was finished as a gas well. The third well flowed 203 barrels of 21 gravity oil through three eighths-inch choke from 3136-48 feet, but salt water encroachment soon became too great and the well is now being deepened. It had a light gas sand at 3303-11 and several salt water sands above 4000 feet.

The Keeran field, also in Victoria County, but several miles north of the McFadden area, is one of the newly discovered oil and gas areas on the Coast. While drilling has been confined to six tests, two oil sands have been uncovered, both by the same operators. C. R. & M. and Bunte et al's Keeran 1, M. de Leon survey, made a large gasser spraying some oil from 5191 feet. The second well, to the east, made a 500-barrel oil well at 5842-51 feet, after passing through the upper gas sand. Other tests are on the sand and will give considerable information as to the possibilities of the field.

Several older gas fields give promise of making important oil producers in the future. White Point, San Patricio County, is one of these. There are 33 producing gas wells in the field with the average open flow capacity being estimated at 30,000,000 cubic feet and the initial rock pressure ranging from 1000 to 1200 pounds. A total of 47 wells have been drilled in this field including dry holes in the immediate producing vicinity, the majority being on the western side of the structure. Gas is obtained from the Miocene sands which are encountered at 1900 feet, 2200 feet, 2300 feet, 2400 feet, and 2550 feet respectively. Approximately 35,000,000,000 cubic feet of gas has been drawn from this field. On November 27, 1930, Saxet Oil Company's Rachel 17 was made a deep test, encountering a sand at 4892-4902 feet, which showed 30,000,000 cubic feet of gas and 100 barrels of oil. It was then drilled to 6000 feet, plugged back to the 4900-foot horizon and has been spraying about 60 barrels of oil daily ever since. The well has an elevation of 42 feet and encountered the top of the Marine Oligocene at 4232 feet. Rachel 19 is now drilling to the lower level.

The structure of this field is an elongated anticline with the axis running in a northeast and southwest direction, and has a closure of approximately 60 feet on the west and northwest sides. The producing area will cover about 2950 acres.

The structure of the White Point field has been interesting to the geologist, as it is now probably in process of folding. Within the records of man in this area, this land has been slowly rising from three to four feet. Oyster beds are found on top of ground and at the field of the same species that are now found in Corpus Christi bay. This theory of forming of White Point and its being made at this time may be the reason that gas alone has been discovered in large quantities and that the structure is too young as yet to contain vast quantities of oil, but that has yet to be proven.



Structure Map of Lucas Field, Live Oak County, Contoured on Shallower Gas Horizon

The Agua Dulce field, Nueces County, covering 1600 acres, is another shallow gas field that has a deeper oil horizon. Controlled by Houston Oil Company and Agua Dulce Oil & Gas Company, this producing zone 2½ miles long and 1½ miles wide, has 18 gas wells. The sands at 1975 and 2030 feet are situated near the top of the Oakville formation. The average initial flow of these wells is 47,000,000 cubic feet with a rock pressure of 860 pounds.

The surface formation is Beaumont Clay of the Pleistocene age and does not lend itself to surface geology, but the correlation of logs using the first gas sand as the datum bed, an elongated dome is obtained with approximately 80 feet of closure. The structure does not dip rapidly to the east, but closes off quickly to the west, suggesting a fault.

The deeper oil, being produced in only two wells, was discovered on December 23, 1930, by Houston Oil Company's Comstock 1 in the southern end of the field. The well showed 135 barrels of 60 gravity oil at 4913 feet. The top of the Marine Oligocene was encountered at 3565 feet.

Lucas field, Live Oak County, is an absolutely controlled proposition, being entirely on the Lucas-Cartwright ranch and being owned and operated by Houston Oil Company. Discovered in 1923, it has been a gas producing area, except for three oil wells from two levels. The field has been handled scientifically to recover the greatest amount of gas from the fewest number of wells. As a result, the 3335-acre producing area has 34 wells, from which it is expected to recover around 1,500,-

000 cubic feet or more per acre. These wells showed an initial flow of 38,000,000 cubic feet of dry gas with a pressure of 1250 pounds from 2020 to 2350 feet.

In the latter part of 1930 and early part of 1931, two important discoveries were made in the Lucas field. Houston Oil Company's Cartwright 23 made 205 barrels from 3566 feet, while Cartwright 24 was completed for 60 barrels from 5320 feet. The gas came from the Gueydan or Catahoula formation of the Miocene age, while the first oil comes from the Oligocene and the second from the Jackson (Pettus division).

Geology of the field reveals a distinct surface dome with Lagarto clay well exposed, surrounded by the Reynosa. This dome has approximately 200 feet of closure and is cut on the west side by a fault striking seven degrees east and with the upthrow side to the east. The exact amount of displacement has not been determined, but estimates give this fault about 120 feet in displacement.

The Sandia field of Jim Wells County, two miles northwest of the town by the same name, is so far limited to the W. D. Wade ranch and controlled by Larcro Gas & Petroleum Company. The discovery well, completed on November 20, 1929, developed 1300 pounds pressure and showed an open flow of 50,000,000 cubic feet of dry gas from 2917 feet. With a ground elevation of 149 feet, the test topped the Marine Oligocene at 2620 feet.

The surface formation at this field consists of a thin overlap of Reynosa with the Lagarto formation well exposed along Penitus Creek and the northwest portion of the field. Surface indications show the field to be an elongated low anticline cut to the northwest by a fault of approximately 70 feet displacement with the upthrow to the southeast.

There have been a number of similar gas discoveries, which will draw future deep drilling for oil. One, for instance, is the Carsil Oil & Gas Company's McGill block at Armagosa, Jim Wells County, where the company's No. 3 well showed 7,000,000 cubic feet of gas at 2804 feet. Gulf Production Company, likewise, has production at the same level in its Schaffer well.

Stanolind Oil & Gas Company's Stratton 1, Section 12, Stratton subdivision, Nueces County, made a large gasser, showing 1850 pounds pressure from 5002 feet in February of this year. Production trouble was encountered and the well has been shut in, pending further development. With an elevation of 115 feet (ground), the well encountered the following sands: 2085-89, dry; 4746-52, test 200 pounds pressure; 4795-4801, good gas pressure; 4991-5002, completed at this depth. The geological features of this structure are unknown at this time; the well was located as a result of geophysical tests. The surface formation is Beaumont clay.

The same company made another important strike two miles north of the Agua Dulce field in Nueces County, also as a result of geophysical work. It has a marked topographical high which is an inlier of Lissie Gravel in the Beaumont clay formation. Two wells were drilled. King 1, Section 23, King ranch, elevation 142 feet, topped the sand at 3893 and drilled to 3899 feet, still in the sand, being completed April 16, 1932, for 30,000,000 cubic feet of dry gas. Well 2, one mile southeast, was completed as a gasser with 1650 pounds pressure at 4023 feet, opening a second sand. The elevation is 126 feet.

On September 16, 1932, Gulf Production Company opened a new gas field on the O'Conner ranch when well No. 2 came in from 5703-7 feet for 50,000,000 cubic feet of gas with 2000 pounds pressure. It is being deepened. The well is located in the southeast corner of the 32,404-acre ranch in Section 40, CEPI & M Survey, just across the Goliad County line in Refugio County.

Welder field, San Patrico County, was discovered on May 1, 1931, by Aransas Oil & Gas Company's Welder 1, which made a dry gasser with 1480 pounds pressure from 3655-63 feet. It was drilled to 3698 feet but plugged back. Welder Oil & Gas Company completed Fee 3, May 5, 1932, at 5663 feet after plugging from 6015 feet, making a gasser. The well showed the following possible sands: 3647-55, dry gas, 1180 pounds pressure; 3659-63, dry gas, 1200 pounds pressure; 4599-4606, shale and sand, dry; 4607-17, salt water; 5008-10, salt water; 5655-63, gas, completed.

The Kingsville field, Kleberg County, is on the extreme southwest edge of this particular zone. If it is a deep seated salt dome, as is indicated, it is too far west to be considered, but this theory is yet to be proved.

If it is to be considered in this group, it is the first oil producer, finding oil and gas production from 2235 to 2381 feet. The block is controlled by Humble Oil & Refining Company and it has spent much money in the development of the property. In 1930 there were seven wells producing 120 barrels of 22.5 gravity oil daily with discouraging results. The field is now virtually abandoned and it is likely that some very important developments will have to occur before any more work is done there.

Completions Widespread In South Texas Fields

San Antonio, Texas.—All South Texas shared in completions during the past week. They follow:

Company, Well and Location	Initial Production Bbls.	Depth
Bastrop County—		
Ogden & Reed, J. W. Mears 1, Leach sur.	*	2220
Bee County—		
C.R. & M. Dr. Co., J. B. Stolzfus 2, J. M. Uranga sur.	*	4322
Tabor, O'Neill & Howeth, J. P. Harris 1, Blk. 13, Sec. 13	*	4322
Bexar County—		
Chiquita Oil Co., A. C. Hunter 1, Sec. 14	12	1618
Eckert & Son, L. Brehm 5, Boquar sur.	12	660
Caldwell County—		
Hickman, Hill et al, Dickerson 1, Rains sur.	*	2175
Webster O. & G. Co., McMahon 1, J. Pinchback sur.	*	2401
Duval County—		
Magnolia Pet. Co., G. Wendt 12, Sec. 44	240	2323
Riley 1, Sec. 45	288	2275
San Diego Oil Co., L. Bennett 4, Sec. 44	240	2312
Sun Oil Co., Duval Ranch 1, Sec. 78	*	2167
Texas Co., C. W. Freer 3, Sec. 45	960	2260
Guadalupe County—		
Suttle et al, Halm 2, Jose Kent sur.	*	1949
Live Oak County—		
M. W. R. Oil Co., W. C. Ohlendorf 1, Blk. 25	*	1200
Refugio County—		
Edwin M. Jones, J. Mitchell 1-B, Refugio sur.	*	9131
Webb County—		
Dyck Oil Co., Villareal 1, Sec. 1100	1680	2215

Rangoon, British India.—Following several years of geological investigation, the Indo-Burma Petroleum Company, Ltd., has satisfactorily proved that the area of the bed of the Irrawaddy River near Lanywa, two miles above the Singu field on the west shore of the Irawaddy, is oil-bearing. The company some time ago began building at considerable expense a concrete guide wall projecting at an acute angle into the river, thereby reclaiming a valuable area of oil-bearing property for exploitation.

Bexar Shallow Production Getting Extensive Play

San Antonio, Texas.—Proration apparently is having a good affect on Bexar County shallow production, for this immediate area is having an excellent increase in activity in proven and semi-proven localities. Small, inexpensive production is proving as profitable, if not more so, than in sectors of the district where deeper drilling and higher lifting costs make the limited amount of production under proration hardly profitable.

The Eckert pool, with its depths ranging from 650 to 825 feet, records pumpers making from five to 15 barrels settled production, the average being around 10 and 11 barrels. In this pool, Eckert & Son completed L. Brehm 5 at 660 feet for 12 barrels, are moving in on L. Brehm 6 and have spudded A. Brehm 1, all in the Boquar survey. In the same survey, W. H. Heniger's T. W. Masterson 3 is waiting on a pump to spud. Gatlin Oil Company's I. A. Beck 15 is down 480 feet and C. W. Richards' J. Halbardier 4 is rigged up. Both wells are in the J. M. Perez survey No. 57. Swearingen et al also are active in field.

Over in the Cooksey pool, Chiquita Oil Company's A. C. Hunter 3, J. Martinez survey, Section 14, is a 12- to 15-barrel well from 1618 feet. Casing is set at 1583 feet.

Down in the new Von Ormy district, also in Bexar County, M. E. Trussell's R. T. Pruitt 1, County Block 4299, is bailing considerable mud and oil from 905 feet. About 525 feet of perforated liner is set in the hole to obtain production from the several sands, which is causing a bit of trouble in completing. The last sand was cored from 877-905 feet. W. L. Whicker et al is preparing to make a location for Bilhartz 1, F. Rolen survey, while Motes-Campbell Company is preparing to start up on its well in the S. Jett survey.

The oil from these various pools, numbering nearly a dozen, is purchased by small refineries in San Antonio and Somerset for local consumption.

Southwest Government Wells Showing Good

San Antonio, Texas.—The southwestern section of North Government Wells field, Duval County, continues to receive nice sized producers. The Texas Company's C. W. Freer 3, Section 45, is good for 40 barrels an hour from 2260 feet. San Diego Oil Company's L. Bennett 4, Section 44, is making about 15 barrels an hour from 2312 feet. Magnolia Petroleum Company's J. W. Riley 1, Section 45, is good for 12 barrels an hour from 2275 feet and G. Wendt 12, Section 44, is rated at 10 barrels an hour from 2323 feet. All initial estimates are through chokes.

Of particular interest is the final completion of the Sun Oil Company's Duval Ranch 1, Section 78, three miles northeast of the North Government Wells producing area. After plugging back to the sand at 2159-67 feet, it was put on a pumping test, showing probably 40 barrels of fluid, 90 per cent of which is reported to be BS and salt water. It, however, might be considered on the extreme east side of the structure and possibly indicates the extension of the producing area of the Government Wells field in that direction or is the key to another pool.

Webb County Field Named "Moca" By Committee

San Antonio, Texas.—Milam Drilling Company is fishing for the swab, line and several joints of drill pipe in Duval Ranch 1, Block 1, ZCSL Survey No. 3, which recently opened a new field in northern part of Webb County. The well flowed around 100 barrels a day or better from 903-8 feet on first tests, but no definite gauge could be obtained due to the junk in the hole.

At a meeting of the San Antonio Geological Society, the Oil Field Nomenclature Committee definitely named this field "Moca."

Dr. D. R. Semmes is making preparations to drill two wells in the field immediately, while the Milam will start an active campaign, it is announced.

Depth Record Holders Plan Further Tests at Refugio

San Antonio, Texas.—Edwin M. Jones is preparing to start Josephine-Mitchell 4, lease 55, Refugio field, Refugio County, about 981 feet southeast of No. 1. Jones drilled Josephine Mitchell 1-B to 9131 feet as the deepest well in the Gulf Coast or in South Texas. It has been abandoned.

George E. Smith, who holds the record of drilling the second deepest well in South Texas, which also was in the Refugio field, has announced a new test to be drilled in wildcat territory of Refugio County. It is on a large block of acreage about nine miles northeast of the old field and about five miles northeast of the Fox production discovered some months ago by United Production Corporation.

Two Victoria County Tests Attain Interesting Depths

San Antonio, Texas.—Keeran Ranch, Victoria County, has two tests at an interesting depth. Union Oil Company of Nevada's 2 well is very low at 5891 feet, while the Gulf Production Company et al's 3 well is coring below 5775 feet. Both are in the M. de Leon survey.

Lease Trades Forecast Laurel Field Activity

San Antonio, Texas.—A half-mile southwest extension, several fairly large trades and a number of new tests make the new Laurel field, high gravity oil producer in Webb County, appear to be one of the most important areas in the lower Mirando district.

Dyck Oil Company's Villareal 1, located in the NE NE NE Survey 1100, and located about one half-mile south of the Rosenburg and Laurel producers, came in December 23 for an initial flow of 70 barrels an hour on choke from a total depth of 2215 feet. Twelve feet of sand was cored from 2197-2209 feet. It has been pinched to 400 barrels. Not only is the producer the largest in the field, but it places several new operating companies within probable producing territory.

One acreage deal was by Reward Oil Company (Earl Calloway et al) of San Antonio for 120 acres, including Block 15, Survey 271 and SW NE Survey 1100 and NW SE of the same survey. The consideration was reported at $35,000 in cash and $75,000 out of production.

Remo Royalty Company, also of San Antonio, bought 60 acres from Martha Gonzalez and F. M. Blair, Jr., for a consideration of $20,000 cash and oil. It is SW SW Survey 1100 and the S½ SW of the same survey.

A couple of other deals are being closed, but not officially announced, which will bring immediate drilling.

The Reward located Laurel 1, 245 feet each way out of the southeast corner of Block 15, Survey 271, and is making a location in Survey 768, about a mile south of the new producer. O. W. Killam has made a location for Villareal 1, Survey 1100. Smidon Oil Company, Sal-Mar Oil Corporation and South Texas Oil Company, discoverer of the field, are active.

Saxet Near Completions Indicate Good Producers

San Antonio, Texas.—A couple more Saxet field wells, both of which look like producers, are in process of completion. Gibson Oil Company's R. Morgan 1, Survey No. 405, is drilling the plugs at 4855-61 feet, where it showed considerable oil. Gulf Port Oil Company likewise is drilling out plugs at 4549-56 feet in Isencee 2, Survey No. 404.

Titus & Calloway are still waiting to complete K. Hutchins 1, Block 30, H. B. Shepherd survey, which has casing set above the sand at 4565-72 feet.

The only other interesting test in the field at this time is Perkins & LeGasse 2 of Gulf Coast Oil Company, Block 26, H. B. Shepherd survey, which has plugged back to 4500 feet after a bad fishing job at 5059 feet.

Season Halts Much Work In South Texas; Duval Busiest

San Antonio, Texas.—Poor weather just preceding the holiday period tended to reduce activity in South Texas during the week just closed.

F. E. Kistler, Trustee, (Grayburg), started up again on McCampbell 1, Lot 1, Block 58, McCampbell Lands, after setting surface casing, and is now below 1935 feet. It is in Aransas County.

No change of importance appears in Bastrop County during the week.

In Bee County, however, Grisham et al are about ready to complete A. J. Hill 1, Section 11, Tuleta field, which recently blew in wild while making a drill stem test at 4036-57 feet. Nichols & Bruner are near 3500 feet in Hedelfels 1, John Ryan survey. Pettus Oil & Gas Company is near the 4000-foot sand in Mauldin 1, Kerr survey. W. S. Poole is preparing to spud J. C. Wood 1 in the H&GN Survey.

In Bexar County, Eckert & Son are moving on Louis Brehm 6 and spudding Adolph Brehm 1, Boquar survey. Gatlin Oil Company is drilling I. A. Beck 15, J. Montez survey at 480 feet, while W. H. Henninger is waiting on pump to spud in T. W. Masterson 3, Boquar survey. R. V. Hill is having engine trouble at 400 feet in M. & A. Boeck 1, J. F. Shepherd Survey No. 314, and O. L. Ray is preparing to spud Tom Dillon 1, M. de Luna survey. C. W. Richards has rigged up J. Halbardier 4, J. M. Perez Survey No. 57. M. E. Trussell is working with R. T. Pruitt 1, County Block 4299, which is showing for a producer at 905 feet. It is bailing plenty oil and mud through the perforated pipe.

Duval County

Buchanan et al are having trouble in getting sufficient water for drilling in Sling 1, Survey 118, Duval County, last reported below 1250 feet. Byrd Oil Company has located P. T. Wright 4 and 5 in Section 101, No. 4 to be drilled immediately. Same operator is working over P. T. Wright 1, total depth of 2311 feet. Central Producers, Inc., has started moving on Johnson-Tuck 5, Survey 42. W. T. Daniels is getting ready to resume drilling on F. J. Smith 1, Section 46, which has been shut down at 800 feet. Highland Oil Company is completing A. Lundvall 4, Section 42, at 2464-84 feet. Humble Oil & Refining Company has moved a rig in for Paul White 10, Section 249, and is drilling in shale at 2250 feet in C. W. Hahl 2, Section 74. Edwin M. Jones is drilling Duval Ranch 1, Section 278, at 645 feet. Ed. Leach is also starting a new well, C. J. Bain 1, Section 264. Magnolia Petroleum Company has several active tests in Government Wells area, including Wendt 13, Section 44; C. W. Hahl 3-A and 4-A, Section 45; J. V. Allen 3 and 4, Section 42; J. V. Reilly 2, Section 45; Broadbeck 3, Section 44. San Diego Oil Company's E. Riley 5, Section 46, should be a completion within the next several days. Sarnosa Oil Company's A. Weil 4, Section 130, also is nearing the sand. W. B. Stewart has located Duval County Ranch 1, Section 362. Sun Oil Company's Duval Ranch 1, Section 78, is showing about 25 barrels of fluid on pump from 2159-67 feet. The Texas Company's C. W. Freer 4, Section 45 and M. B. Johnson 4, Section 42, are drilling wells, as is Wendt 3, Section 42. Windsor Oil Company has made location for L. L. Cummings 3, Section 44.

Amerada Petroleum Corporation's Halff & Oppenheimer 1, W. F. Halsel survey, is drilling below 5650 feet. It is Frio County's only test.

In Goliad County, CR&M Drilling Company's J. R. Kauffman 1, G. Sutherland survey, is drilling at 2203 feet.

B. E. Brock et al's Ogletree 1, Robert Smith survey, has reached 2065 feet and is shut down. John F. Camp's Sue Denman 3, William Arrington survey, is drilling black and gray shale at 2230 feet. They are in Guadalupe County.

W. P. Chancellor is starting a well in the S. Anita Survey, Hidalgo County, on the famous McAllen ranch.

Humble Oil & Refining Company is resuming drilling below the casing at 1214 feet in Fuhrman 1, Phillip Sacks survey, Jim Wells County.

H. J. Porter is preparing to spud C. L. V. Reasonoer 1, J. C. Martinez survey. Tippett and Mull's Smith 1, also in Karnes County, is down 200 feet.

Carroll Brown's R. A. Rackley 1, L. J. Sparks survey, Live Oak County, had a show of gas at 370 feet and is drilling ahead. H. A. Pagenkopf is preparing to spud A. E. Nichols 1 in the Bridget Haughtey survey.

Longhorn Oil Company is preparing to spud C. T. Lark 2, Block 14, E. W. B. Scrugham survey. R. S. Nixon et al have spudded Z. A. Booth 1, Section 21, Borcher Ranch sub division. Jack A. Tarver set eight-inch casing to 350 feet in J. Dickinson 1, Section 45.

Nueces County

In Nueces County, Capps and Smith are around 4900 feet in Hutchins 1, Survey 416. Gibson Oil Company is preparing to complete R. Morgan 1, Survey 405, which tested 15 fourbles of oil and 60 pounds pressure in 15 minutes from 4855-61 feet. Gulf Coast Oil Company had completed a fishing job at 5059 feet in Perkins & Legasse 2, Section 26. Gulf Port Oil Company is spudding Frank Bliss 3, and has set 526 feet of surface casing in Smith 2. Its Isencee 2, Survey 404, is about ready to complete, showing 16 fourbles of oil and 60 pounds pressure in 15 minutes from 4549-56 feet. Houston Oil Company's McGregor 2, Survey 311, set 518 feet of surface casing. Titus & Calloway also are expecting an early producer, it being K. Hutchins 1, which has the sand at 4565-72 feet and has drilled out the plugs.

Humble Oil & Refining Company is drilling O'Conner 3, F. Rios survey, Refugio County, at 4238 feet, and Edwin M. Jones is preparing to start up on Josephine Mitchell 4, Lease 55, Refugio survey.

San Patricio

Saxet Oil Company's F. S. Rachel 19, J. N. Seguin survey, in San Patricio County, is drilling around 3500 feet.

Not many late reports are available from Starr County. B. & B. Oil Company's Kelsey Bass 1, Porcion 87, is drilling at 3652 feet. Goodwin & Yantis are still waiting to drill the plugs at 934 feet in Seabury et al, Section 3, total depth 960 feet. Same operators are preparing to spud Walker 1, Isabel Lopez property, Survey 767. Great Plains Oil Company (Jim Cloud) is drilling Sanchez 1, Section 344, at 1076 feet. Jeffries-Lambert Drilling Company likely will carry Starr County Cattle Company 1, Block 34, Porcion 89, deeper, afer showing a tremendous gas pressure at 1516-22 feet.

Gulf Production Company et al's Keeran 3, M. de Leon survey, Victoria County, is testing a sand at 5640-59 feet. Quintana Petroleum Company is spudding S. W. McCormick 1, SA&MG Survey No. A314. Union Oil Company is coring Keeran 2, M. de Leon survey.

O. W. Killam is starting Villareal 1, Survey 100. Milam Drilling Company's Duval Ranch 1, Block 21, Zapata County School Land Survey No. 3, is fishing at 908 feet. D. R. Semmes will drill Duval Ranch 1 and 2 immediately, they are on lots 22 and 21, respectively. South Texas Oil Company's Laurel 5, Block 10, Section 270, will be completed in the next day or so, already having the sand, and B. Rosenburg 9, Block 16, Survey 271, of the same operation, is starting up.

Conroe Will Lead Gulf Coast Activity in 1933

Houston, Texas, Dec. 30.—Friday's survey revealed Conroe field, Montgomery County, with 114 operations listed, by far the greateset number of drilling projects on the report of any Gulf Coast field for several years, and a condition which seems to justify the prediction that Conroe will contribute the greatest amount of flush oil along the coast in 1933.

December 30 the length of the field from east to west was 24,000 feet, or about 4½ miles. The length from north to south production extremities was 26,500 feet, or a little over five miles. In the rough area of 23 square miles thus represented, only 82 wells were on production December 27 when the daily output figure of 18,558 barrels was gauged, showing that the present proved confines of the field provide a reservoir of sufficient magnitude to constitute a market factor whether East Texas be kept shut down or not.

Analysis of operations revealed the following:

Drilling wells	35
Waiting on cement around the 5000-5100-foot horizon	13
Rigs	15
Derricks waiting rigs	9
Bonafide locations	41
Wells shut down	1
Total drilling operations	114

Tabulation elsewhere in this section of the book shows 11 producers completed at Conroe during the week for an aggregate initial production of 14,790 barrels. Three wells, brought in too late for the tabulation, added 5400 barrels to the above figure, making Conroe's initial production for the week 20,190 barrels, or an estimated production capability of 14 Conroe wells surpassing the restricted output of the whole field as of December 27.

As indicated by the number of wells that have reached the point of cementing the final string of casing before drilling into the 5000-5200-foot horizon (found at varying depths in the field between these two figures) Conroe's flush oil for the first week of the new year probably will approximate the figure of 20,190 barrels attained this week. Probabilities of this are increased by the fact that a number of wells listed as actively drilling were already in or within less than a hundred feet of the level at which cementing is usually done.

Since purchase of the Strake Oil Corporation properties early in the year, Humble Oil & Refining Company has continued to lead in field development. It continues to do so, and hence has the greatest daily recovery from the field. However, there are a number of other operators in the area who were not on the scene of action so early but who have shown a spurt in development during the past month, notably the Sun Oil Company, The Texas Company, and Tidal Oil Company, all of which have sufficient acreage to warrant the assumption that Conroe, with increased competition, and an increasing list of operators, will complete far more wells in 1933 than in 1932, barring shut-down or a demoralized market.

Late completions not shown in the tabulation were: Harrison and Abercrombie's Alexander 3, estimated good for 2160 barrels at 5121 feet; Humble Oil & Refining Company's South Texas Development Company 25, estimated capable of producing 1128 barrels per day from 5161 feet, and The Texas Company's Elizabeth Moody 2, estimated at 2112 barrels per day from 5100 feet.

Test Planned on Poteet Farm in Madison County

Houston.—Having got together a block of about 10,000 acres southeast of Madisonville, in Madison County, Midway Oil Company will drill a test on the Sarah B. Poteet farm in the J. S. Hunter Survey, according to E. H. Cooper of Houston. The operators plan to spud about January 10.

The location for the Poteet test is three miles west of an old gas well drilled to 2000 feet in 1921, which Mr. Cooper states is still making some gas.

Important Wharton County Wildcat Test Abandoned

Houston.—Mechanical difficulties experience last week in two important wildcat being drilling in Wharton County by Cullen & West, independent operators in the Gulf Coast, resulted in abandonment this week of Hudgins 1 at 5768 feet. The well had been drilled to the above depth when it became necessary to go back and sidetrack at 1622 feet. A few hundred feet of new hole was made below this latter depth during the week before abandonment.

Hudgins 1, southwest of the town of Hungerford, was located 330 feet each way out of the southeast corner of the Hudgins 319-acre tract in the Alexander Jackson Survey. It did not report having encountered any important showings of oil or gas.

Surface casing collapsed in Cullen & West Hawes 1, located a mile northeast of Hungerford, when the wildcat reached 6022 feet a week ago. The casing was milled through subsequently and the well December 30 was drilling below 6531 feet in brittle shale.

Dayvault, Tyler and Gardner, doing prospect drilling in the William Kincheboe Survey south of Glenford, were nearing 3200 feet.

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large block of acreage south of the town of Louise, set another string of casing at 1221 feet this week and is waiting for cement to set in Stewart 1, reported last week as waiting on cement 67 feet. This test is in Section 25 of the Morris Cummins Survey and about five miles south of Louise.

Dry Hole Leaves Gulf But One Wildcat in Gulf Coast

Houston.—Abandonment this week of Gulf Production Company's American National Insurance Company at 6650 feet in the Sandy Point district of Brazoria County left that organization with but one wildcat in the Texas sector of the Gulf Coast, and it probably will be listed as an abandonment or completion shortly after the first of the year.

The remaining wildcat is Lockwood 1, Brazoria County, reported December 30, drilling in shale at 7250 feet. It is in the Wiley Martin Survey, midway between Damon Mound and West Columbia.

Humble Buys Half Interest In Colorado County Block

Houston.—Coyle-Concord Oil Company of San Antonio sold an undivided one-half interest in the seven-eighths mineral lease on its 15,600-acre block in Colorado County to the Humble Oil & Refining Company, it was officially announced December 28 by Arthur J. Coyle, president. The latter company will have the operation of the lease under the name of Coyle-Concord-Humble.

The consideration was not made public.

There is one producing well near the center of the block, being the Stewart Nelson 1, I. & G. N. Survey No. 44, about ten miles from the town of Garwood. The well was completed July 17 as an 80,000,000 cubic-foot gasser, spraying a quantity of high gravity oil or distillate, and showing a pressure of 1700 pounds. The sand was topped at 4021 feet and the total depth of the well was 4052 feet. A string of seven-inch O.D. casing with 26 feet of screen was set to bottom. At a depth several hundred feet shallower the well showed for a large gasser.

The Coyle-Concord organization holds considerable of this block in fee.

The producer is on what is believed to be a very deep seated salt dome, which furthers its interest and importance. This, however, it is only problematical.

There has been a location made by the Coyle-Concord-Humble for McLane 1, located 300 feet from the north and east lines of the southeast quarter of Section 42, I. & G. N. Survey. It is about one mile north of the discovery well, which is shut in. The well will be drilled with an electric rig as was the first producer.

Schwab's Polk County Test Cementing Back to Mill Out

Houston.—Dick Schwab's Davis Holmes 1, Polk County wildcat located eight miles south of Livingston and about 1050 feet west of southwest of this operator's Carlton Davis 1, discovery well of a new oil and gas producing area, was reported cementing back from 4415 feet to mill out.

Davis Holmes 1, with an elevation of 224 feet, topped the Hockleyensis 107 feet lower than the discovery well. A production test at 4360 feet was unsatisfactory. Decision was made to try for a producer in the upper Cockfield. At 4434 feet the well swabbed down to 1200 feet. And later, at 4415 feet, it flowed six or seven barrels an hour for four hours after swabbing four days.

Most of Coast's Flush Oil From Rabb Ridge - Conroe

Houston.—With the exception of 60 barrels from Esperson and 140 barrels from Humble, all of the Texas Gulf Coast's initial production of 20,798 barrels came from Conroe and Rabb Ridge, the two youngest major reservoirs in the district. Eighteen producers were completed.

Conroe registered 12 completions, of which 11 were oil wells having an aggregate initial estimated at 14,790 barrels per day. Rabb Ridge registered four completions, total initial production of which amounted to 5808 barrels.

Three out of the four abandonments of the week were wildcats.

A detailed list of Texas Gulf Coast completions follows:

Company, Well and Location	Initial Production Bbls.	Depth
Conroe—		
Alpha Pet. Co., Keystone Mills 1	1080	5093
Gulf Coast Dr. & Prod. Co., So. Tex. Dev. Co. 1	*	5940
Hooper Oil Co. and Rutherford, W. N. Hooper 3	330	5131
Humble Oil & Ref. Co., Alexander D-2 (Initial Prod. Unknown) is producing	240	5141
A. Moorehead 1	792	5112
E. Moorehead 1	2904	5150
South Gulf Oil Co., Granger 1 (Eastern outpost)	420	5144
The Texas Co., Elizabeth Moody 3	1920	5108
W. S. Rhodes 1 (half mile south of field)	792	5085
Tidal Oil Co. and G. W. Strake, J. W. Lewis Est. 1	1080	5093
J. W. Lewis Est. 2	2784	5138
R. D. Violette & E. D. Griffin, Mrs. Fannie Hooper 6	2448	5151
Esperson—		
Cranfill & Reynolds, Esperson 5 (wo)	60	3082
High Island—		
Yount-Lee Oil Co., Smith 13	*	4621
Orange County—		
Houston Oil Co., E. Hurst Fee 1, E. Hurst Sur. No. 15	*	6023
Rabb Ridge—		
Gulf Prod. Co., Edwards and Riggins 2	1440	5250
Humble Oil & Refining Co., Mary Gubbles 2	792	5300
Humble and Gulf, George A-3	2016	5262
T. R. Booth 4	1560	6250
Humble—		
Martin, Drake and Jones, Whelan & Pickens 3	125	3015
E. M. Wilson Oil Co., Whelan & Pickens 2	15	1398
Wharton County—		
Cullen & West, Hudgins 1	*	5768

Gueydan Wildcat of Pure Oil Company Looking Good

Houston.—Pure Oil Company's Mulvey Irrigation Company 2, wildcat test on Gueydan dome in Vermilion Parish, Louisiana, was "looking good" in a hard sandy lime at 3645 feet December 30. The well's completion as a producer would probably bring Gulf Refining Company into Gueydan as an operator, it being an offset to that company's 161-acre Connor lease.

Most Gulf Coast Wildcats Shut Down During Holidays

Houston.—Wildcat developments in the Texas sector of the Gulf Coast were dull during the week owing to the fact that only 25 of the 85 wildcat tests were listed as active. Of the remainder, 46 were shut down for various reasons, four were rigs, six were derricks, and four were locations.

There were no developments to excite immediate lease plays in any of the areas involved, though there were some which may have accelerated lease cancellations.

Gulf Coast Drilling & Production Company's South Texas Development Company 1, an attempted 4500-foot southeasterly extension of Conroe field, and therefore a wildcat, was abandoned at 5940 feet in shale. The well was drilled on a location 4500 feet east of Plummer and McDaniels' Keystone Mills 1 and in T.&N.O. RR. Survey No. 9 of Montgomery County.

Jack Schultz's O. M. Todd 2, Cheek dome prospect in the William Carr Survey of Jefferson County, was changing rig at 7000 feet. This well is 1800 feet south of Schultz's Todd 1, abandoned

earlier in the year at 6906 feet. Both tests encountered conclusive domal indications and some minor oil and gas shows.

Another abandonment of the week was Houston Oil Company's E. Hurst Fee 1, located 2000 feet from the south and east lines of the E. Hurst Survey No. 15, Orange County. The well was drilled to 6023 feet without a drill stem test.

Sun Oil Company was the only active wildcatter in Austin County, its R. W. Theuman 1, Juan de Leon Survey, coring sandy shale at 3230 feet.

Cedar Brake Test Shut Down

Danciger Oil & Refining Company's operations at Cedar Brake, or Pledger, in Brazoria County, remained shut down, but Gulf Production Company continued active on two tests in the county: American National Insurance Company 1 was drilled to 6650 feet and abandoned at Sandy Point, E. R. Bradley Survey, and Lockwood 1, in the Wiley Martin Survey, midway between Damon Mound and West Columbia, was drilling at 7250 feet.

Three wildcats were active at Manvel, Brazoria County. Alpha Petroleum Company's Nichols 1-A, Lot 2, H. N. Little Survey, had passed 600 feet. Gamble et al's Sherwood 1, Lot 15 of the same survey, was a derrick, and The Texas Company's Belcher 4, H. N. Little Survey, was drilling ahead below 2300 feet after having set casing at 1270 feet.

All Brazos and Burleson County wildcats were reported shut down.

In the Sophie Plummer Survey, northeastern corner of Chambers County, Yount-Lee Oil Company was reported in shale at 6408 feet. Weaver and Ray's Fisher 1, John Ijams Survey of Chambers County, was reported in shale and sand at 2431 feet.

Colorado County wildcats have shut down until after the first of the year.

In Fort Bend County, Lowrie and Young et al's Brown 1, Barrett and Harris Surveys, was reported in sticky shale at 3731 feet. Reisinger was drilling below 1033 feet in Joe Sitta 2, Long Point district. The remainder of Fort Bend, Galveston and Grimes County wildcats were reported shut down.

With a depth of about 5220 feet, Houston Oil Company and Republic Production Company were reported to have cored oil sand slightly above that depth in Ariola Fee Y-1 in Hardin County. Ariola Fee Z-1 was reported in sand rock at 5265 feet. The remainder of Hardin County wildcats and all except one of the Harris County wildcats were reported shut down. This one was Dr. Lilly et al's Wilson and Hunt 1, W. Ritchie Survey, reported drilling at 1840 feet.

In Jefferson County, Carroll and Miller were rigging Mashman 1 on a 13-acre tract in the W. B. Dyches Survey. James Papadakis has made a location in Liberty County for Eicke 1 in a 300-acre tract in the Reason Green Survey.

In Matagorda County there were three drilling wildcats. Cockburn Oil Corporation's Hawkins 5, Sheppards Mott prospect, having had hard sand at 4152 feet, was drilling ahead below 4610 feet. United North & South Development Company was reported drilling below 4900 feet in St. Louis, Brownsville and Mexico Railroad 1 at Buckeye, and Humble Oil & Refining Company had passed 5122 feet in Pierce Estate 1, located in the Isaac Foster Survey between Bay City and Pledger.

With the exception of Sutton and Hawkins, reported tied up with a fishing job at 3900 feet in Foster 1, Jose Maria de la Garza Survey, all Montgomery County wildcats were shut down, as were the wildcats in Newton, Orange, Polk, San Jacinto and Trinity Counties.

Tyler County

In Tyler County, Republic Production Company and Houston Oil Company were reported drilling around 5630 feet in Sterne Fee 1, wildcat located in the Adolph Sterne Survey four miles southeast of Spurger which has shown for a gas well at 4708 feet. Three miles west, their Kirby-McShane 1 is rigging up on a location in Section 17 of the B.B.B.&C. RR. Survey.

Cullen & West had reached 6022 feet in Hawes 1, one mile northeast of Hungerford in Wharton County, but collapsed surface casing necessitated a milling job which has lost considerable hole for them. Their Hudgins 1, southwest of Hungerford in the Alexander Jackson Survey, had reached 5768 feet, but it had to sidetrack at 1620 feet, losing nearly 4000 feet of hole before abandoning. Dayvault, Tyler and Gardner, drilling Dayvault 1 in the William Kincheloe Survey of Wharton County, were reported making hole at about 3115 feet. Pure Oil Company, developing a large block of acreage near Louise, was waiting on cement at 1212 feet in Stewart 1 in Section 25 of the Morris Cummins Survey. Smith and McDannel's Mitchell 1, Abstract 661 in the southwest quarter of the H. & T.C. RR.Survey No. 8, was drilling in sticky shale at 6445 feet. Steed Production Company's Lurker 1, Leech dome prospect, had set 10-inch surface casing at 710 feet.

South Louisiana Wildcats Frolic Through Christmas

Houston.—A study of progress made in wildcat wells this week is testimony to the fact that never was the Evangeline country of Southern Louisiana truer to its tendency to commemorate anything that resembles a holiday by abstaining from labor and luxuriating

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7 YEARS in 1 HEAD

Seven years ago we built a tubing head. It met the requirements of operating companies from the standpoint of design, material, size and weight. It was properly balanced, was made of the best steel available for the purpose, it eliminated parts which formerly added more to size and load than to strength. It was small and light, required little space, and was easy to handle.

Today we are still building one tubing head, the same one we built seven years ago. It has undergone the many tests of various high pressure fields during these seven years. It has continued to hold satisfied customers it made seven years ago. Evidence of its quality is seen in orders we have received for more than 750 of these heads within the past three months.

GRAY TOOL COMPANY
HOUSTON, TEXAS.

in an almost poetic quietude. Fifty per cent of the wildcats were shut down.

Darrow dome, being a recent discovery of Rio Bravo Oil Company in Ascension Parish, was naturally kept busy, like a new toy. The company's Gamble Lumber Company 1 was reported nearing 2000 feet, while its O'Neil 2 was a derrick. The drilling well at Darrow is 600 feet west of Community 1, discovery well which was completed at 4035 feet for 2400 barrels.

Calcasieu Parish wildcats holidayed in true Acadian fashion, not a suggestion among them of profaning the Yuletide by even circulating, much less making any hole.

A lone Cameron Parish wildcat, not a full-blooded one, just a sort of half breed or semi-wildcat, attested dangerous materialistic inclinations when Magnolia Petroleum Company's Cameron Meadows 3, at Cameron Meadows, made 800 feet of hole to reach sand rock at 3833 feet.

Standard Oil Company of Louisiana kept up the struggle at Choctaw dome in Iberville Parish, reaching 1382 feet in Gay 3.

The Texas Company's Caillou Island 7, Section 19-23s-20e, Caillou Island dome, Terrebonne Parish, was rigging up.

In Vermilion Parish, Pure Oil Company had drill stem stuck (at 4717 feet) in Alliance Trust Company 3 at Gueydan. Mulvey Irrigation Company 2 at Gueydan was drilling at 3580 feet.

Three Wells Completed in Coastal Louisiana

Houston.—Louisiana Gulf Coast is credited with three completions during the week, and of these, two were producers having a combined initial production estimated at 1860 barrels

East Hackberry, consistently the busiest spot in Coastal Louisiana throughout 1932, was responsible for 1620 barrels of the flush oil, while the remaining 240 barrels came from The Texas Company's Louisiana Land and Exploration Company lease at Leesville, La Fourche Parish.

Tabulation of Coastal Louisiana's completions for the week follows:

Company, Well and Location	Initial Production Bbls.	Depth
East Hackberry—		
Calcasieu Oil Company, Watkins 36	1620	2848
Old Hackberry—		
Yount Lee Oil Company, School Land 11	*	5706
Leesville—		
The Texas Company, L. L. E. Leesville 6	240	3516

Louisiana Permits to Drill Greater Than 1931

Shreveport, Louisiana. — Permits to drill granted in Louisiana during the week totaled five, bringing the state's total for the year up to 445, representing an increase of 136 over the 309 permits for new wells granted in 1931.

In Bossier Parish, Cryer Oil Company of Houston was granted a permit to drill Cryer 1, 2400 feet north and 1080 feet east of the SWc of Section 25-19n-12w.

In Iberia Parish, Jefferson Lake Oil Company of New Iberia, was granted a permit to drill Lake Peigneur 42, —12s-5e, 150 feet northwest from Well No. 36 and 150 feet northeasterly from Well No. 41 in Section.

In Sabine Parish, G. W. Longley et al of Winona, Texas, were granted a permit to drill Peavy-Wilson 1, 16-5-9w, 350 feet south and 330 feet west NE corner section. Ritchie Producing Corporation, Shreveport, was granted a permit to drill N. A. Stille 1, 36-8n-11w, 685 feet north and 330 feet west of SE corner SE NW Section. Roberts & Sledge, Oklahoma City, Oklahoma, were granted a permit to drill 4 L Lumber Company, 29-8n-10w, 290 feet north and 468 feet east SW corner NE SE Section.

Sabine Parish Deep Tests Find Marker Depths Vary

Shreveport, La.—Wildcatting activity in North Louisiana continued at a comparatively low ebb last week, the Christmas-New Year holiday lull and bad roads being the contributing factors.

Considerable interest has been aroused over the logging of anhydrites in the lower Cretaceous at depth of 4445 to 4447 feet in E. T. Oakes' Johnson 1, Section 30-13-15, a wildcat in DeSoto Parish near the village of Longstreet. Elevation of the test is 288 feet. The test last week was coring broken lime and shale at 4489 feet.

The encountering of anhydrites in Johnson 1 at sub-sea depth of 4157 feet as compared to logging of first anhydrites in lower Cretaceous at sub-sea depth of 5225 feet in R. L. Gay, Trustee's Bowman-Hicks A-1, NW NW Section 10-8-13, Sabine Parish, about 23 miles south, shows it checks 1068 feet higher than the latter on the anhydrite contact. On the contact of the Zwolle marl Oakes' test picked it up at sub-sea depth of 1312 feet as compared to 1632 feet in Gay's test. The former test penetrated the lower Cretaceous 1581 feet before logging anhydrites while the Gay test went 2060 feet into lower Cretaceous before logging that formation.

Oakes' Johnson 1 has had three oil shows below the 4000-foot level, one (an oil odor) at 4080-89 in tight sand, another oil odor at 4191 to 4198 feet in tight sand and at 4240-46 feet a core of oolitic lime showed considerable oil. A very green sand that however showed no oil was logged at 4303-8 feet. All through the Nacatosh there were shows of gas.

In Bienville Parish Robert S. Ross is still moving in rig for Beck 1, NE NE Section 3-18-8w, and Texana Oil Company has location for Lawson 1, NE NW NE Section 28-16-9w.

In Bossier Parish, A. W. Phillips, Trustee, after encountering a show of oil in tight sand at 1007 feet in Nacatosh has shut down and may set a string of eight-inch casing in Oden 1, NW NW Section 4-18-13. In the same parish Steckol and Breazeale who are standardizing Nattin 1, SW NE Section 15-22-14, at 3028 feet, are moving in rig for Nattin 2, NW NE Section 22-22-14. Southwest several miles of the two latter tests but across the line in Caddo Parish, Bolinger & Walker are drilling at 1800 feet in Thompson 1, Section 16-22-14.

In Claiborne Parish, United Gas Public Service Company is rigging up for its 4500-foot test, Meadows 1, NE SE Section 13-21-5w, on a 12,000-acre block.

In DeSoto Parish, Honeycutt Oil & Gas Company's Porter 1, Section 26-12-13, is shut down waiting on casing at 2905 feet after missing two drill stem tests. Mrs. Aleene Ibach, Trustee's Rambin Estate 1, NW NE Section 32-11-11, is shut down at 800 feet. Warren & Carig's Wagner 1, Section 5-12-14 is being cleaned out to resume at 750 feet.

In Grant Parish A. W. Phillips, Trustee's Cameron 1, Section 27-7n-3w, has cemented surface casing at 60 feet and H. H. Temple's Edenborn 1, Section 20-7n-3w, has materials on location.

Sabine Parish

Few tests were active last week in Sabine Parish. In the Converse wildcat area where there is a single producer, Gibson-Johnson & Higgins' Frost Lumber Company 2, Section 15-9-13, was given the acid test to see about the possibilities of production in the 1500-foot zone where this well showed for a small producer. After pouring in chemicals it was discovered liner was broken and due to bad roads no more acid could be taken to the well immediately. Total depth is 1901 feet and a second oil show at the 1600-foot level in this well will be tested.

LeGrand & Jackson are arranging to test McGough 1, Section 2-8-10, northeast of Zwolle production about eight miles, at a depth around 2400 feet. Loring Oil Company's deep test, Bowman-Hicks 21

Section 16-7-12, has a hung drill stem at 5440 feet. C. W. Smith et al's Pattison 1, Section 30-10-11 is being cleaned out to deepen from 3185 feet. Frank Foster, Inc., is rigging up for Gaddis 1, NE NE Section 20-9-11, in the wildcat Spring Ridge field. Head & Lambert are moving in a heavy rig for a test in Edwards 1, NW SW NW Section 29-9-13 in the Converse area, three fourths of a mile southeast of Gibson-Johnson and Higgins' Frost Lumber Company 1, Section 19-9-13, the discovery well of Converse, and one mile north and a quarter east of J. J. Kean's Belton 1, Section 31-9-13, that showed oil at the 1600-foot level and at 3100 feet, finally having to be junked and abandoned. Head & Lambert have obligation to drill at least one well to test the Woodbine at 3100 feet and the Washita at 3300 feet and if the first test is a producer in the marl at the 1500-1600-foot zone they will drill the second test to the deeper horizons. Pleasant Hill and Spring Ridge, both in Sabine Parish, produce from the Washita.

In Union Parish Wing Hong, Trustee, is arranging to resume at 2425 feet.

In Webster Parish, Silvey et al's Drake 1, Section 14-19-10, is drilling at 2125 feet.

In Vernon Parish, Earl Jones' Willis 1, Section 32-3n-9w, is rigging up.

North Louisiana Gets Only 25-Barrel Pumper

Shreveport, La.—One 25-barrel pumper was the only commercial well completed in North Louisiana last week, activity remaining at a low ebb due to the holiday season and to bad roads. Besides the pumper, which was in the Zwolle field of Sabine Parish, there were three abandonments including a wildcat test to 4348 feet in Lincoln Parish several miles northeast of the Sugar Creek gas field.

A list of the last week's completions in North Louisiana follows:

Company, Well and Location	Initial Production Bbls.	Depth
Lincoln Parish—		
Benedum & Trees, Dubach Lbr. Co. 1, 25-20n-4w	*	4348
Natchitoches Parish—		
Dr. H. S. Gerson et al, Smith Island 4, 11-10-8w	*	618
Sabine Parish (Zwolle)—		
Pelican Nat. Gas Co., Sabine Lbr. Co. 9, 3-7-13	25	2400
Silvey & O'Mara, Sabine Lbr. Co. 1, 9-7-13	*	2308

Weather Delays Starting Wildcat in Rapides Parish

Alexandria, La.—Location for a 5000-foot wildcat test in N½ NW Section 4-4n-1e, Rapides Parish, Hixson-Simmons 1, was announced last week by J. B. Evers of Longview, Texas, and George Collingsworth of Boston, Massachussetts. They plan to spud by January 10 if materials can be gotten to location by that time; plans to start earlier were changed due to bad roads. Some of the materials are already at the location.

This is the second location for Rapides Parish in the play for the "Conroe trend" across Central Louisiana between the Sabine Uplift and the Gulf Coast area. Petroleum Industries, Incorporated, has derrick up for Lee 1, SW NW SE Section 13-5n-2e, in that parish.

Three Locations Follow Completion In Arkansas

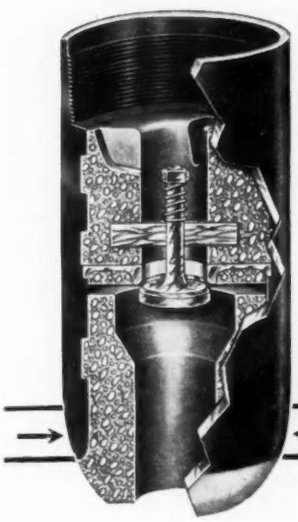
Texarkana, Ark.—Three new locations were announced in Miller County, Southwest Arkansas, during the last week, following in the wake of the third producer completed the previous week in that county, Roy Baker et al's E. L. Beck 1, SW SE Section 33-15-26, at a total depth of 2926 feet, flowing 290 barrels of 32.2 gravity oil daily through 2½-inch choke.

New locations made last week are: Hapgood and associates' Rose 1, SE NE SE Section 7-16-26, materials; C.

a New Idea IN GUIDES

Larkin HERCULEAN GUIDE for Float Shoes and Guide Shoes

Larkin overcomes weakness of concrete guides



Sixty percent of the tapered portion is on the steel shoe itself. Note the vital spot. See how much of the tapered portion is composed of *steel* instead of concrete and yet none of guiding function is lost—taper is gradual and not too abrupt—this means less grief. At a 20 degree angle the entire thrust or contact is on the steel shoe, eliminating the possibility of

→ THE VITAL SPOT ←

breaking the concrete when it comes in contact with obstructions in the hole. It has greater strength than any other guide with absolutely no metal to be removed from the hole. Furnished on Float Shoes and Guide Shoes larger than 7". Our regular Bakelite Guides furnished in sizes under 7". The Float Shoe is equipped with a water-tight positive acting Bakelite valve.

All valves are given a 2000 lb. hydraulic pressure test.

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H. Nelson et al's Rose 1, located 155 feet south and west NE SE NW Section 4-16-26, is a derrick; and Jenkins et al's B. F. Smith 1, located 330 feet north and west SE SE SE Section 32-15-26.

Foster et al's H. F. Smith 1 is now designated as the same operators' Georgia Jones 1. It is located 660 feet south and 200 feet west NE NW NW Section 29-16-26, and is rigging up.

No other locations were announced in Arkansas during the week and there were no completions.

Arkansas Outside Miller County Generally Inactive

Texarkana, Ark.—Drill stem tests in two Miller County wildcats featured interest last week in southwest Arkansas' new oil field where there are three commercial wells. Steen Drilling Company late in the week was arranging to make a drill stem test at 2960 feet in Head 1, SW SW Section 20-15-26. Duluth-Arkansas Oil Company's Beck 1, NW SW Section 34-15-26, shut down at 2930 feet after testing only a small amount of oil and gas.

Most of the wildcats outside Miller County remained inactive during the last week. In Lafayette County Charles McDonald's Allen 1, Section 11-19-26 shut down at 3014 feet. In Little River County American Portland Cement Company's Fee 1, SW NE Section 21-12s-32w, shut down at 855 feet.

In Miller County the holiday lull and bad roads also had their effect. Besides the tests already mentioned, Stephens and Byers were drilling at 1450 feet in Jones 1, NE NW Section 14-16-27. Sorells and Tidwell were arranging to resume at 750 feet in McCowan 1, NW SE Section 22-15-28. Byrd et al's Miller Land & Timber 1, NW SE Section 29-18-27, is a derrick.

In Union County, E. H. Cassity's Dumas 1, SE SW Section 10-17-16, was still rigging up. Graves et al's Patterson 1, NE NE Section 31-19-16, spudded and shut down at 100 feet, and J. K. Wadley and J. P. Evans' Moore 1, SE SW Section 35-19-17, was coring at 2238 feet. Pigeon Hill Oil Company's Union Sawmill 1, NE NE Section 9-17-12, is a derrick.

Other Arkansas wildcats remained inactive.

Houston.—Unconfirmed rumors are to the effect that Danciger Oil & Refining Company, recent discoverer of Cedar Break, or Pledger, field in Brazoria County, will develop what is known as the Garwood prospect in Colorado County by taking over a substantial portion of holdings of L. E. Hults three miles southwest of Garwood.

Eight Producing Wells in Sale of Osage Field Land

Osage, Wyo.—It is reported here that the holdings of Lambie Oil Company in the Osage oil field, eastern Wyoming, have been sold to Western States Oil Company for $69,000. The deal involves 240 acres of the Julius Bock land located in NW and W NW Section 14-46-64, on which there are eight wells with an aggregate production of 40 barrels per day. There are two wells not on production, and which have not been tubed.

Pending Dry Creek Well Has Chance for Big Output

Red Lodge, Mont.—Carbon Oil & Gas Company will have the next completion in the Dry Creek field in Carbon County, southern Montana. The McMinn 1, NW Section 7-7s-21e, has been drilled deeper to 5551 feet in the Dakota and picked up another sand. It is bailing and swabbing for a test, and it is believed that it will make a good producer.

Materials are being moved in on the Croft permit, SW SE Section 34-6n-21e, for a test to be drilled by unidentified interests, believed to be from Kansas City.

Big Piney Well Is Not Big But Is Making Good Oil

Kemmerer, Wyo.—Cretaceous Oil Company encountered a two-barrel production of perhaps the highest grade of crude oil ever developed in Wyoming in its test in the Big Piney field, north of LaBarge, Section 7-28-115, southwestern Wyoming. The oil was taken direct from the well and used as gasoline in an automobile making the trip from Big Piney to Kemmerer. Test is to be drilled deeper.

Aztec Field, New Mexico Completes 20-Barrel Well

Hobbs, New Mexico.—There was but one new completion in New Mexico fields reported last week. The R. C. Oswell interests completed No. 3, NE NE Section 26-10n-10e, for 20 barrels at 1442 feet in the Aztec field.

Company, Well and Location	Initial Production Bbls.	Depth
Aztec Field—		
R. C. Oswell, No. 3, NE NE Sec. 26-10n-10e	20	1442

Weather Slows Down New Mexico Wildcat Activity

Hobbs, New Mexico.—No completions were announced among the wildcat wells of the state last week, and no new locations. Unseasonable weather has slowed up operations in the more remote areas.

In Bernalillo County, Norrins Realty Company is drilling Pajarito Grant 1, Section 22-9n-1e, around 3725 feet. The same company's Galegas Grant 1, Section 19-11n-4e, had a total depth of 115 feet at last report.

In Chaves County, the Warman Oil Trust has shut down waiting for pipe, with the hole bottomed at 275 feet. The well is Weldon & Hoar 1 and is located on SE Section 9-14s-25e.

In DeBaca County, Landowners Oil Company's State 1, NE Section 16-1s-27e, is drilling below 5324 feet.

In Dona Ana County, Middle States Oil & Gas Company's Boretzi 1, Section 14-26-5e, is a rig. Viking Oil & Gas Company has made no report on its test on SW NE Section 26-23-5e, which had reached a total depth of 250 feet some weeks ago.

In Guadalupe County, McMillan 1 of the New Mexico Producing & Refining Company, Section 24-5n-16e, is waiting for orders at 4507 feet. New Mexico Exploration Company's No. 1 Anton Chico Grant, SW Section 20-9n-17, is drilling in sand below 1100 feet.

In Rio Arriba County, rig is up for the Pan-States Oil Company test to be drilled on Section 26-3s-1e.

In Roosevelt County, Good 1 of Peterson and others, SE NW Section 32-5s-1e, has a rig up.

In San Miguel County, Cabra Springs Oil & Gas Company's Thompson 2, NE Section 22-12-22, has shut down at 410 feet because of water shortage.

In Santa Fe County, Kelsey Clients' test is drilling in arkose at 950 feet. The well is No. 1, Section 26-10n-10e.

In Valencia County two tests are reported to be resuming: Homer C. Mills, Incorporated's, No. 2, SE SE Section 9-6n-3e, on the Tome Grant, is bottomed at 446 feet, and the No. 1, NW SW Section 29-6n-3e, is bottomed at 501 feet. Work at both will be under way again, it is said. Western Natural Resources Corporation has set the 8¼-inch casing at 3610 feet and is waiting for line; location is on NE Section 5-6n-1e.

Allen Lake Test Will Get Gas or Go Deeper for Oil

Casper, Wyo.—Ohio Oil Company has spudded in with rotary equipment for Kanawah 1, SW NW NE Section 34-23n-79w, on the Allen Lake structure, four miles northwest of Medicine Bow in Carbon County, Wyoming, and about 65 miles south of Casper. This is intended for a test to the gas sands, but it may be drilled deeper if gas is not developed in commercial quantities.

One well drilled on this structure several years ago encountered a production of 30,000,000 cubic feet for which at the time there was no market. Another was drilled by the Kanawah Oil & Gas Company, and likewise found gas production.

Colorado Has One Gasser, One Abandonment in Week

Denver, Colo.—Magnolia Petroleum Company completed its third gasser on the Piceance Creek structure, in Rio Blanco County, northwestern Colorado, last week. The well is good for four million cubic feet of gas from a sand at 2953-88 feet.

In the Blackwolf district, in Yuma County, Major Petroleum, Inc., is reported to have abandoned its Winegar 1-A, SE NW Section 7-2s-43, which has been standing for months bottomed at 1535 feet.

Tabulation of the completions follows:

Company, Well and Location	Initial Production Bbls.	Depth
Rio Blanco County—		
Magnolia Petroleum Co., No. 3	¶ 2988	
Blackwolf District—		
Major Petroleum Co., Winegar 1-A	* 1535	

Most Colorado Wildcats Will Resume in Spring

Denver, Colorado.—Operations were generally at a standstill throughout Colorado last week, due to the severe winter weather which brought everything to a full stop a fortnight ago. Most of the tests under way will not be resumed until spring.

In the northeastern part of the state, in Weld County, Ramsey Petroleum Corporation drilled Tighe 1, SW NE SE Section 15-7n-59w, deeper to 6762.5 feet, and it flowed 10 barrels of oil and 100 barrels of water from there. It is understood that the test will be carried still deeper, according to the present plan. Test of the water would indicate that it is not coming from the Dakota sand in which the well is now bottomed. In the Greasewood Flats area, Reiter-Foster Oil Corporation is standing shut down at 850 feet on NE SE 24-6n-61w.

In Adams County, Hills Dome Lease Development Company's test on SE Section 27-3s-68w, is shut down for the winter at 4119 feet.

In Arapahoe County, McDeb Drilling Company's Fitzsimons 1, NE Section 7-4s-66w, is fishing for 4¾-inch casing with a total depth of 6110 feet.

In El Paso County, Gulf States Oil Corporation's Carson 2, NE Section 10-16s-66w, has shut down for the winter at 2000 feet.

In LaPlata County, McGarr Petroleum Company has a rig up for Pinon Mesa 1, NE¼ Section 34-33n-12, and J. W. Irwin & Company's Doescher 1, NW Section 29-33-13, plans to drill deeper with rotary from 3171 feet.

In Larimer County, C. Leonard Smith's U. P. 1, SE SW Section 31-21n-69, is standing at 172 feet.

In Lincoln County, Eastern Colorado Oil Corporation's State 1, NW Section 36-14s-57w, has a hole full of water from the Dakota sand and has shut down at 3464 feet.

In Routt County, Mid-Colorado Petroleum Company's Omholt 1, SE Section 29-4n-87, has shut down for the winter. Hole is bottomed at 1917 feet where a flow of two million feet of gas was reported. It is understood that the test will be deepened in the spring.

Two Good Producers Completed in Montana

Casper, Wyoming.—Two completions were reported last week in Montana, both in the Dry Creek field in Carbon County, and both by the Ohio Oil Company. Robinson 7, SE SE Section 3-7s-21e, is producing both from the Dakota and the Lakota sands and is good for about 600 barrels per day. Bowman 1, SE NE Section 4-7s-21e, is also producing from both sands and is also good for about 500 barrels.

Company, Well and Location	Initial Production Bbls.	Depth
Dry Creek Field—		
Ohio Oil Co., Robinson 7	600	....
Bowman 1	500	....

Montana Wildcats Wait For Better Weather

Browning, Mont.—No progress was reported last week from the various wildcat wells under way in Montana. Continued severe weather was responsible for the shutdown, and, as is usual at this time of the year, it is not anticipated that many tests will attempt to continue operating.

In Carbon County, the test of Corbett Royalty Company, SW SE 1-6s-23e, has been drilled to 1245 feet, and Jack Creek Oil & Gas Company's No. 2, SE Section 15-7s-23e, is down 1400 feet.

In Fergus County, the Melton Corporation's No. 1, SW¼ Section 24-31n-17e, plans to run pipe for water shutoff when drilling work is resumed in the spring at 3305 feet.

In Gallatin County, Montana Gas & Petroleum Corporation's Adams 1, Section 35-2n-1e, is drilling below 1730 feet.

In Glacier County, the Fulton interests will drill a wildcat well on NE Section 16-34n-6w, as soon as weather permits.

In Yellowstone County the Peter Antonioli test, NE Section 2-2n-25e, is bottomed at 2370 feet, ready to run the casing. The Rice-Fulton wildcat on Devil's Hole structure, Section 20-2n-23e, will resume operations as soon as road and weather conditions permit.

Osage Field, Wyoming, Has One Completion

Casper, Wyoming.—Only one completion was reported in Wyoming last week. It was the Yellowstone Petroleum Company's Logan McCullough 1, NW NW NE Section 23-46-64, which was good for one million cubic feet of gas and 50 barrels of oil after it had been shot. The well is in the Osage field in eastern Wyoming.

Company, Well and Location	Initial Production Bbls.	Depth
Osage Field—		
Yellowstone Pet. Co., Logan McCullough 1	¶1-50	....

Wyoming Wildcats Are Hindered By Weather

Casper, Wyoming.—In Big Horn County, Crosby and Huntington are still held up in the Denio 1, Tract 43-C, Section 15-55-97, because of the bad weather. The well is standing at 610 feet. It is on the South Garland structure, south of the proved territory of the Garland field.

Work was resumed after a shutdown for frozen water lines by the St. Onge Oil & Gas Company in the wildcat well on the Redwater structure in Crook County, northeastern Wyoming. The well had been standing at 800 feet in the Minnelusa.

In Fremont County, Ward Oil & Gas Company ran the 8¼-inch casing to bottom at 4300 feet in the test on the Dutton Basin structure, Section 28-34-90, and is ready now to continue drilling ahead. This is a rotary test.

It is probable that work at both wildcat wells in Natrona County will be at pretty much of a standstill until spring. The Summit Oil Company well is standing at 1825 feet on Section 21-33-80. The Leo B. Murphy test on Platte River dome, SE NW Section 29-33n-80w, has not been spudded in although the rig is up.

In Platte County, the test being drilled to the granite by the T. B. Oberman interests, NW SE 30-21-68, is believed to have shut down for the winter at 170 feet.

In Washakie County, on the Hidden Dome structure, the Bales Oil Trust well, Brome 1, NE NW 13-48n-90w, is standing at 1430 feet. It has not been tested or put on production to date.

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Birch Run Township Wildcat Showing Oil

Mt. Pleasant, Mich.—Smith Petroleum Company's Johns 1, Saginaw County, Birch Run Township, Section 21, a wildcat well, made commercial oil production from 1530 feet in the Bera sand. The pipe filled with 150 feet of oil twice after being bailed out and then was shut down. It was shot and made 10 barrels.

The Bera sand formation showed a vein about 18 feet through and then slate was encountered and drilling suspended. The well is about five miles from the old Saginaw field which was produced about three years ago from the Bera formation but since has been practically abandoned.

Near Johns 1 is a Dundee well which now produces from two to five barrels a day when worked.

Three Locations Made in Michigan; Two Last Week

Mt. Pleasant, Mich.—Three new operations were commenced in Michigan during the week, two in Midland County and one in Muskegon County.

George C. Hanners has made a location on the Geneva Oil Company 1, Midland County, Greendale Township, NE SW SE Section 15, and in the same township R. D. Malcolm made a location on the Hastings 3, NE NW Section 13. Both locations are in the proven field.

In Muskegon County, A. S. Cochran made a location on the Giles 1, Muskegon Township, SE SW Section 6.

Two new operations were announced in Michigan last week. Pure Oil Company will offset to the west their Yost 1 wildcat, the first location to be made following the strike two weeks ago.

The well will be listed as Yost B-1, Midland County, Greendale Township, NE NE SE Section 34. Yost 1 made 1155 barrels initial from 3457 feet, bottom hole, in the Dundee lime. It is located in the center of an area of several thousands of acres of undeveloped land.

Pure Oil Company also made the other location last week, Rhemenschnider 2, Midland County, Greendale Township, NW SW Section 15, in the proven field.

Michigan Outside Wildcat Operation Generally Idle

Mt. Pleasant, Mich.—Of the wildcat operations in Michigan which number around 20, many have been shut down either temporarily or indefinitely with the exception of those located in the central part of the state.

In Gratoit County, J. G. Tiplady's Laycock 1, Arcadia Township, Section 11, is drilling in the Traverse at 2910 feet. Shell Petroleum Corporation's Mellinger 1, North Star Township, Section 9, is reaming at 510 feet; and the same company's Covell 1, Seville Township, Section 15, is fishing for tools at 570 feet.

Ralph W. Melhorn's Kerr 1, a shallow well test for gas, Elba Township, Section 2, is drilling at 220 feet.

In Isabella County, Shell Petroleum Corporation's Fritz 1, Broomfield Township, Section 13, is drilling at 615 feet, with the drive pipe landed at 574 feet. E. S. Hammond's Graham 1, Chippewa Township, Section 22, is drilling at 1200 feet.

Midland County

Pure Oil Company is developing the only two wildcat tests in Midland County at the present time, drilling at 3200 feet in Fergus 1, Greendale Township, Section 21; and spudding Yost B-1, Greendale Township, Section 34, a west offset to the Yost 1, completed for 1155 barrels a day recently.

Strange Oil & Gas Company's Littlefield Ranch 1, Clare County, Scurrey Township, Section 9, is drilling at 500 feet.

Other active wildcat tests through the state are as follows: Snavely and Craft's Norman 1, St. Clair County, Grant Township, Section 22, drilling at 325 feet; Oil Properties Corporation's McNitt Estate 1, Wexford County, Harning Township, Section 10, drilling at 850 feet; Johnson Oil Refining Company's Gilipin 1, Oceana County, Leavitt Township, Section 15, drilling at 450 feet; Muskegon Oil Corporation's Kops 1, Dalton Township, Muskegon County, Section 22, drilling at 900 feet.

Michigan's Three Wells Produce 150 Barrels

Mt. Pleasant, Mich.—The majority of the drilling operations in Michigan were shut down over the Christmas holidays to delay somewhat a number of Dundee completions. Two completions were made during the week.

Guy Miller's Rhinehart 1, Midland County, Greendale Township, NE SE SE Section 13, approximately a half mile southeast of the east end of the Central Michigan pool, showed brine in the Dundee and probably will be abandoned without deeper testing, bottom hole 3570 feet.

In Saginaw County, Smith Petroleum

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Company completed Johns 1, Birch Run Township, Section 21, a wildcat well, for 10 barrels a day after shooting. Production is coming from the Bera sand with a total depth of 1530 feet.

Four other wells in the proven field are drilling in the top of the Dundee lime and probably will be completed within the next 10 days.

Only two completions were made in Michigan last week, both in the Central Michigan area. Pure Oil Company's Root A-3, Midland County, Greendale Township, Section 18, NW NW SE, located on the west border of the east extension pool, was good for 40 barrels initial and is being prepared for acid treatment. Bottom hole is 3582 feet.

Isaac Schuler's Rhemenschnider 2, same township, NE SE Section 14, also in the proven field, made 100 barrels on initial from 3553 feet, producing from Dundee lime.

Columbia Oil & Gas Company's Gilson Fales 1, Midland County, Greendale Township, NE NE SE Section 16, completed for 125 barrels initial November 30, was increased to 1000 barrels a day when treated with acid. The well is producing from Dundee lime, 3565 feet.

Try Hot Acid

An experiment is to be made on the Michigan Gas & Oil Company's Bond 2, Midland County, Greendale Township, SE SE NE Section 12, which was completed in September this year for 50 barrels a day in the Dundee at 3553 feet but which since has fallen off to about five barrels. Acid was used but failed to revive production. Now heated acid is to be run. According to tests made heated acid has a greater dissolving effect on the dolomite in the Dundee lime than when applied without heat.

Wellman Oil Company's Rhinehart 2, Midland County, Greendale Township, SE NE SE Section 13, is shut down on top of the Dundee sand and Columbia Oil & Gas Company's McLaughlin 4, same township, SW SW NW Section 15, is drilling at 3400 feet, the only two wells in line for completion within the next week in proven territory.

Company, Well and Location	Initial Production Bbls.	Depth
Midland County—		
Guy Miller, Rhinehart 1, ne se se Sec. 13, Greendale Twp...	*	3570
Pure Oil Co., Root A-3, nw nw se Sec. 18, Greendale Twp...	40	3582
Isaac Schuler, Rhemenschnider 2, ne se Sec. 14, Greendale Twp.	100	3552
Saginaw County—		
Smith Pet. Co., Johns 1, Sec. 21, Birch Run Twp.....	10	1530

Gray County Buyers Have Three Groups of Prices

Amarillo, Texas.—Leading purchasers of crude in the Texas Panhandle district are divided into three groups in their price postings, with a difference of 22 cents per barrel prevailing on the top grade of Gray County oil. Magnolia Petroleum Company is alone in holding out for a top price of 82 cents for Gray County crude testing 40 gravity and above, and 70 cents for the highest posting on Carson-Hutchinson County oil, having adopted the schedule December 16.

Philtex Pipe Line Company, purchasing subsidiary for Phillips Petroleum Company, put in the lowest schedule effective December 15 after having paid more than some of its competitors during the previous 60 days. This company quotes a top price of 60 cents for Gray County, and 50 cents for 40 gravity and above in Carson, Hutchinson and Moore Counties. It is the only buyer in Moore County. Sinclair Prairie Oil Marketing Company adopted a similar schedule retroactive to December 15, and the Danciger Oil & Refining Company fell in line December 23.

Humble Oil & Refining Company, Gulf Pipe Line Company and The Texas Company quote a top price of 68 cents for Gray County, and 63 cents for the other areas.

North Alabama Test Guided By New Method of Location

Mobile, Ala.—Joseph Bruner et al are moving rig from a recently abandoned test in Lowndes County, Mississippi, to one of the two locations they have in Marengo County, Alabama. These two locations are in Sections 23-14-1e and 36-14n-2e.

In Baldwin County, Alabama, H. H. Givens is coring and drilling around 550 feet in his test in Section 10-6s-5e. C. V. Carey and associates are arranging to resume at 710 feet in King 1, NE NE NW Section 35-8s-4w, Cullman County. P. J. McAlpine et al are still waiting orders at 3350 feet in Gardner 1, NW NW Section 22-15s-16w, Lamar County, Alabama.

In north Alabama, a test which is being drilled without much information being disseminated is C. O. Jaggers et al's test in Lawrence County, drilling below 2100 feet. It is rumored that some "positive" work was done on this block by a new process being used by Prof. Arthur Bauder of the University of Alabama. Prof. Bauder of the department of physics and electrical engineering is said to claim to have developed an electrical method of locat-

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ing oil bearing strata to a depth of 3000 feet and is trying to develop it to reach greater depths. The process roughly consists of making two electrical contacts with the earth a mile or two apart in an area where oil is suspected.

High Water Halts All Work In Jackson Gas Field

Jackson, Miss.—With practically all the wells in the Jackson gas field under water or location inaccesible therefrom, activity was at a low ebb last week. There were no completions or new locations in Mississippi for the week.

In Covington County Owen and Modisette's Eastman-Gardiner Mineral Company 1, NE NW Section 29-9n-16w, is rigging up. In Jackson County, Gulf Refining Company is alternately drilling and coring Dantzler Lumber Company 1, SW SE NE Section 27-4s-8w.

In Jasper County, L. Spraragen and B. B. Jones are drilling in base of the Midway at 3798 feet; elevation is 600 feet.

In Wilkinson County, southwest Mississippi, in the path of the "Conroe trend" Foster Creek Oil Corporation's Foster Creek Lumber Company 1, SE NE Section 14-2n-2w, has spudded and shut down at 320 feet in sand waiting for 12½-inch casing which will be set around 400 feet; elevation is 320 feet. Humble Oil & Refining Company has an interest in this test and has a huge block surrounding these operators' block.

Other Mississippi wildcats were inactive.

Kentucky Completes Four Producing Wells

Cleveland, Ohio.—Illinois, Kentucky, Ohio, Pennsylvania and West Virginia were the states contributing 28 completions for Eastern States fields during the week. Although Kentucky completed only four wells, all of them were producers, and it led the district in initial production contributed with 231 barrels. Ohio, with nine gas well, led in new gas contributed, with an aggregate initial production estimated at 6,250,000 cubic feet.

A detailed list of Eastern States completions for the week follows:

Pennsylvania

Company, Well and Location	Initial Production Bbls.	Depth
Allegheny County—		
Reilley Oil Co., Reilley Hrs. 1	¶¼	2150
Beaver County—		
Blagle Oil Co., Blagle Hrs. 1	2	1400
Greene County—		
Washmuth & Callahan Gibbin 1	¶¼	1110
James H. Null & Co., Rice 2	¶¼	3199
Kentucky		
Daviess County—		
Ellis & Ashby, Ramsey Bros. 3	20	850
Brenner, Adams & Co., Jackson 10	185	685
Ohio County—		
Louisville Gas & Electric, Royal 2	10	....
B. & B. Oil Co., Greer 8	16	685
West Virginia		
Boone County—		
C. P. Jones & Co., McKinney 1	¶¼	1917
Cabell County—		
R. H. Adkins & Co., Williams 1	¶¼	2147
Phillip Hager & Co., Marshall College 1	¶½	2941
Gilmer County—		
Patsy Crude Oil Co., Fisher 2	10	....
Pleasants County—		
Hammett & Holpp, Hammett 1	*	....
Ritchie County—		
Drake Oil Co., Drake Hrs. 1	10	1676
Wetzel County—		
E. M. Hannan & Co., Stender 1	*	....
Central Ohio		
Belmont County—		
Bradfield & Co., Shutway 1	¶1¼	1073
O. F. G. Huntsman, Gallagher 1	¶¼	1865
Coshocton County—		
Preston Oil Co., Snyder 2	36	3306
Guernsey County—		
Wilbur Keith, Muhlbeck 1	*	1118
Holmes County—		
Lydic Oil & Gas Co., Martin 3	¶¼	905
Meigs County—		
Summner Oil & Gas Co., Roush 2	¶¼	1800
Muskingum County—		
Ohio Fuel Gas Co., Staker 3	¶¾	4190
Stark County—		
Kime & Co., Menegay 1	¶2	4550
Plain Natural Gas & H. Co., Burdell 2	¶½	4405
East Ohio Gas Co., Charles 3	¶1	4226
Northwestern Ohio		
Lucas County—		
A. J. Doblinger & Co., Nultz 1	5	....
Wyandot County—		
Gimbill, Burton & Knaus, Walton 1	¶¼	1407
Illinois		
Crawford County—		
W. C. McBride, Inc., Oldham 1	*	1620

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1. Casing Perforating Gun
THE LANE-WELLS COMPANY

The Lane-Wells Company, 4493 Santa Fe Avenue, Los Angeles, California, has developed a casing perforating gun which is particularly adapted to piercing two or more concentric strings of pipe cemented one within the other.

The standard gun consists of a body composed of 12 sections arranged for threaded connection to each other. Each section contains two opposed perforating mechanisms, which in turn consist of a removable powder chamber, arranged for threaded reception of the barrel. Suitable electrical connection is made to each powder chamber to energize a special thermal element embedded in the preloaded powder charge.

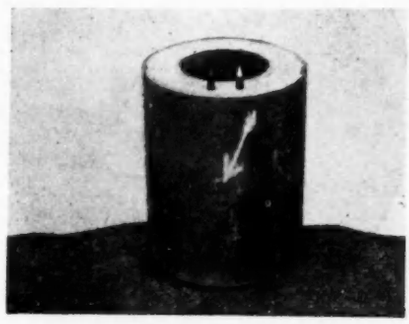
The gun is suspended and run in and out of the well on a specially developed electrical cable with an ultimate strength of over eight tons, although the 24-shot gun complete with operating accessories weighs less than 600 pounds. Entrance to the top of the gun is through an insulated rope socket, immediately below which is the control mechanism encased in a steel tube interposed between the suspending rope socket and the gun body proper.

Assembly of Perforating Gun.

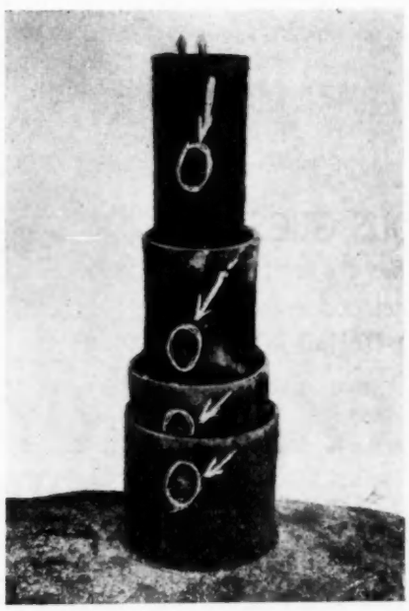
Provision has been made to exclude moisture when perforating under great fluid depths, and when the gun is loaded and ready to be run into the well it is hermetically sealed throughout, and remains so even after all shots have been fired.

The 24 shots of the standard gun can be fired one at a time successively, or in any desired grouping, the control mechanism being electrically operated through the suspending cable from the mouth of the well, and is at all times under the control of the operator. Any desired vertical spacing of perforations is obtainable, as well as any spiraling of the perforations around the casing.

Powder ignition is accomplished by use of a special thermal element not susceptible to shock or concussion. The gun cannot be accidentally discharged or prematurely fired and is not connected to the firing circuit until positioned in the well at the depth where perforation is desired.



Above, hole through Concentric Cemented Casing. Below, showing clean hole through each pipe.



Actual performance records, according to the manufacturer, include complete penetration without any deformation of the casing of a concentric string composed of 6⅝-inch, 26-pound, Class C, A.P.I. casing inside of 8⅝-inch, 36-pound, Class C, A.P.I. casing, inside of 10¾-inch, 45-pound, A.P.I. casing inside of 12-inch line pipe, the .450-inch steel bullet piercing all four strings and passing on into the formation. This test was made both above ground and under water.

In field operation the gun is run in and out of the hole from a hoist mounted on a service truck and driven by the truck engine. Electrical energy for firing operations is generated by a special power plant carried on the truck. Indicating means on the truck shows the position of each

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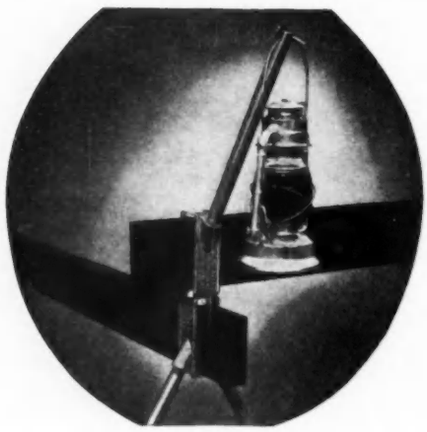
successive shot, as well as proving that each shot has actually been fired. The complete set up has been designed along the lines of "safety first."

2. Trench Guard

CLEVELAND TRENCHER COMPANY

The Cleveland Trencher Company, 20,100 St. Clair Avenue, Cleveland, Ohio, has announced a new trench guard.



The guard rail holder swivels in any direction, assuring equal efficiency no matter at what angle the rails are set. They are interconnected. This connecting of the rails has two advantages. It cuts in half the number of supports required on any job and sets the alternate rails at different heights, adding greatly to the attention value. Another feature is the combination lantern and flag support which places either well above the guard rail, and in full view from every direction. Flag or lantern is secured in position by the insertion of pin or nail.

The trench guards are made of rust proofed malleable iron. The galvanized pipe legs and lantern-flags supports are threaded for ease in setting up and dismantling, and the entire guard can be packed in small space for transportation.

3. Well Surveying Apparatus

GEOPHYSICAL RESEARCH CORPORATION

Geophysical Research Corporation, 65 Broadway, New York, has been assigned the patent on a patent on a method and apparatus for well surveying invented by Dr. Irwin Roman, Michigan College of Mining and Technology.

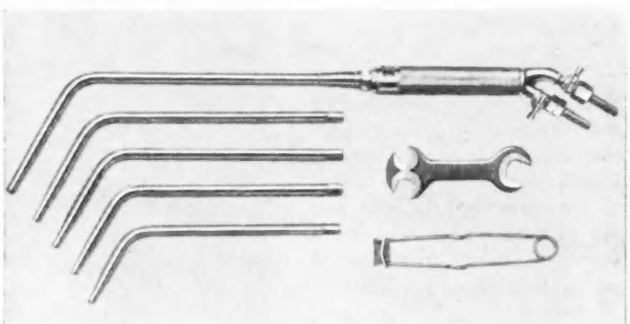
The apparatus is essentially a magnified yardstick used to measure deflection. Within a tubular casing is a device for recording the position of two compass needles at opposite ends of the two. By checking the relative positions of the needles and making certain mathematical calculations, the operator can find by how many degrees he is off vertical, and the azimuth.

Two compass needles are employed to prevent misinterpretation on the theory that the presence of magnetic bodies would disturb the magnetic field and deflect a single needle. According to Dr. Roman, the positions of the needles should be recorded when the upper needle is at the surface, where true north is known, and the tube should then be lowered the distance between the two needles, where another reading should be taken. Repetition of this process will give the amount of deviation.

4. Welding Torch

THE LINDE AIR PRODUCTS COMPANY

The Linde Air Products Company, 30 East 42nd Street, New York, N. Y., has announced a new welding torch to its Purox No. 28. Its utility is such that it will handle heavy-duty work as easily as the average job, according to the manufacturers.



Purox No. 28

Ten one-piece, 60" goose-neck tips, numbered from 6 to 15, are available for use with this torch. They are well built, with plenty of hard-drawn copper stock to withstand the intense reflected heat of the heaviest welding job. By means of a union nut these tips may be adjusted so as to point in any direction. Thus, overhead or vertical welding can be accomplished without any change in the normal grip of the torch handle.

Tips Nos. 6, 8, 10, 12, and 14 are furnished with the torch, giving it a range from 16 gauge sheet up to heavy castings. By using the Purox No. 21 Cutting Attachment with this torch, steel up to two inches in thickness can be cut.

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Squeaks *from the* BULL WHEEL

During the recent political campaign two deacons of the same faith religiously, but on opposite sides of the fence politically, attended prayer-meeting services.

"O Lord," intoned the Republican deacon, "I pray thee that the Republicans may hang together—"

"Amen," ejaculated the Democrat.

"But not, O Lord," continued the Republican, "in the sense that my Democratic brother means, but in the sense of accord and concord."

"Any cord'll do. Lord; any cord'll do," was the Democrat's closing thrust.

"My son came out today. He got four months taken off his sentence for good conduct."

"There you are. I always said you would be proud of that boy."

A Swedish farmer, asking for his naturalization papers at Minneapolis, was being quizzed by the judge.

"Are you satisfied with the general conditions of this country, Mr. Olson?" the judge asked.

"Yah sure," was Olson's answer.

"And does this government of ours suit you?"

"Vell, yah, mostly, only Ay lak to see more rain."—*Capper's Weekly.*

"Children," said the school mistress to her class of young hopefuls, "I want you all to write an essay on 'The funniest thing I ever saw.'"

The class commenced, but one small boy managed to finish before the others.

"Let me see your effort first," said the teacher.

The boy produced a paper, on which was written:

"The funniest thing I ever saw was too funny for words."

"Here's a ticket for the conjurin' show, Maggie."

"Thank ye, Donald," said his wife.

"And hark ye, Maggie, when he comes to that trick where he takes a teaspoon o' flour and one egg, and mak's twenty oam'lettes, watch vera close."

A New York taxicab driver was hailed by a speakeasy doorman, who escorted four men to the cab, arranged them carefully within, and instructed the chauffeur:

"That man on the left goes to —— Park Avenue, the next one to —— East Sixty-fifth Street, the one on the left front seat to —— West End Avenue, and the other to ——Riverside."

The driver nodded understandingly and drove away. In a few minutes he was back, beckoning to the doorman.

"Hey, buddy," he said, "would you mind sortin' these guys out again? I hit a bump on Sixth Avenue."

"So you are undertaking to keep bees?"

"Yes," answered Farmer Corntossel. "I don't want to miss anything, and I've been stung every other way there is."

"What is your worst sin, my child?"

"My vanity. I spend hours before the mirror, admiring my beauty."

"That is not vanity—that is imagination."

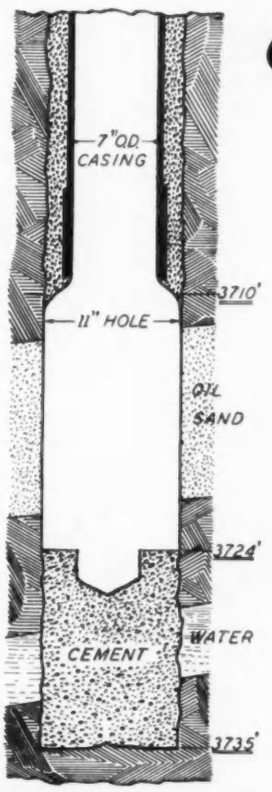
"What happened to Holligan?"

"He drowned."

"An' couldn't he swim?"

"He did—for eight hours; he was a union man."

No other tool can do this!



Hole after under-reaming 14 ft. of solid cement . . . shutting off bottom water and exposing oil sand.

Here's a *Real Job* of under-reaming . . . and here's how the Ward Oil Co. at Kilgore, Texas, solved it last month.

They drilled a 11″ hole to 3735 ft.; set 7″ pipe at 3710 ft. and brought in the well with considerable water.

They plugged back into pipe—then drilled plug with 6¼″ bit to 3724 ft.

RESULT . . . neither oil nor water.

Knowing oil sand to be cemented off, they used a BAKER Rotary Hydraulic Expansion WALL SCRAPER to cut cement out to original 11″ hole . . .

FINAL RESULT . . . OIL AND NO WATER.

That was a good job—under-reaming 14 ft. of 11″ hole *thru a 7″ casing* . . .

Only a BAKER Wall Scraper can handle a job like that! ! !

***For details, see page 45 in* COMPOSITE CATALOG**

BAKER OIL TOOLS, INC.

HUNTINGTON PARK, CALIFORNIA

COALINGA TAFT HOUSTON OKLAHOMA CITY TULSA NEW YORK

Two Noble County Wildcats Watched in Oklahoma

(Continued from page 37)

NWC Section 23-15n-7e, was drilling at 1965 feet.

The Oklahoma County wildcat of Carter Oil Company et al, Shawbell 1, CSW NE Section 1-12-4w, which has created considerable interest, the past week proved a disappointment. It encountered the top of the Wilcox at 7110 feet and cored from 7111 to 7116 feet, getting a show of salt water. It was shut down at 7141 feet in sand.

In Beckham County, Pattee Royalty Company's Goose Tree 1, SW SE SW SE Section 32-10n-23w, was still shut down at 1865 feet.

One new test was begun during the week. Denver Producing & Refining Company's Noe 1, NW SW SW Section 34-10n-10w, in Caddo County, was building a rig.

The Seminole County test of Donley et al, Shepard 1-B, SE SE NE Section 4-8n-8e, was still shut down at 1500 feet.

In Washita County, McWhirter et al's Vanderneck 1, NE NE NW Section 3-7n-19w, an old well drilling deeper, was shut down at its old total depth of 1902 feet.

In Pottawatomie County, Payne Drilling Company's Lovelace 1, CSW SW NW Section 27-6n-4e, was still a cellar.

The comparatively recent test in Hughes County, Nash Redwine's Uri 1, CNE Section 10-5n-11e, was drilling at 385 feet.

Reports on the two tests in Pontotoc County were as follows: Blackwell Oil & Gas Company's Abbott 1, NW SW NE Section 14-4n-6e, after having rebuilt its burned rig, had set 10-inch casing at 1060 feet and was drilling at 1100 feet. Sunray Oil Company's Grant 1, CSE NE Section 11-4n-8e, set five-inch casing at 3024 feet, and encountered sand at 3080 to 3096 feet for a hole full of water.

In Coal County, Fink & Russell's Miller 1-A, an old well drilling deeper, SE SE NE Section 10-2n-8e, was still shut down at 2750 feet.

The Pittsburg County test of Independent Oil Company, Dallas James 1, CNE NE Section 28-2n-15e, only recently commenced, was shut down at 75 feet.

Another wildcat in Coal County, Dodd & Burton's Grigsby 1-A, NW SE NE Section 35-1n-8e, also was shut down, at a total depth of 1100 feet.

Three of the tests in Atoka County were shut down. Barton et al's Miller 4, SE NW SE SW Section 26-1n-14e, remained shut down at 505 feet; Hicks Oil Company's Morris 2-A, SE NE NW SE Section 5-1n-15e, was shut down at 267 feet; George's Reddin 1, SW NE SW Section 19-1n-15e, was shut down at a total depth of 640 feet.

The Marshall County test of Lee Cross, Hamlin 1, SE SW SW Section 26-6s-5e, was shut down at 753 feet, and in the same county, Thomas et al's Setliff 1, SW SE SE SW Section 36-5s-6e, was shut down at 645 feet.

In Atoka County, L. E. Stewart et al's Stewart 1, SE C NE Section 2-4s-10e, was drilling at 850 feet in shale. In the same county, Brookshire et al's Guinn 1, NWC Section 18-3s-10e, was shut down at 3425 feet in lime.

In Stephens County, Gillette Brothers No. 1-A Cooley, NW SE NW Section 17-2s-8w, was shut down at 1850 feet.

Wilcox Crude Schedule Requires a Sharp Pencil

Tulsa.—With a wide variation of gravity schedules posted by the different Mid-Continent purchasers, producers and royalty owners have been wondering who is paying what for crude. Just as this problem is well along toward solution comes H. F. Wilcox Oil & Gas Company with its "scientific schedule" which is something absolutely new in more than 28 years which have elapsed since the first gravity schedule was posted in the Mid-Continent. The company's statement, issued Tuesday, December 27, is as follows:

"Effective 7 A.M. January 1, 1933, and until further notice, H. F. Wilcox Oil & Gas Company will pay the following prices for crude oil purchased by it and delivered into its lines.

Oklahoma

"The price of crude oil will be based upon the daily low quotation for U. S. Motor Gasoline below 57 octane as shown by the Chicago Journal of Commerce. For each one-eighth of one cent so quoted in this publication for such gasoline, we will pay 2½ cents per barrel for oil having the gravity of 40 and above. All oil below the gravity of 40 the following discount will be made:

	Per Barrel
39 to and including 39.9 gravity	2 cents
38 to and including 38.9 gravity	4 cents
37 to and including 37.9 gravity	6 cents
36 to and including 36.9 gravity	8 cents
35 to and including 35.9 gravity	10 cents
34 to and including 34.9 gravity	12 cents
33 to and including 33.9 gravity	14 cents
32 to and including 32.9 gravity	16 cents
31 to and including 31.9 gravity	18 cents
30 to and including 30.9 gravity	20 cents
29 to and including 29.9 gravity	22 cents
Below 29 gravity	24 cents

The schedule for Gray County, Texas, will be the same as for Oklahoma."

It appears that producers and royalty owners dealing with Wilcox Oil & Gas Company will be forced into a large amount of bookkeeping, along with the purchasing company itself.

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SHREVEPORT, LOUISIANA

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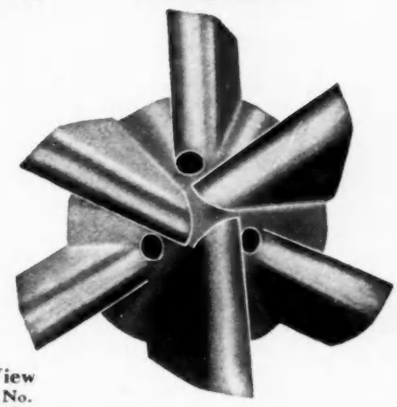

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